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CONSUMPTION OF PROCESSED FARM FOODS

in the UNITED STATES

Marketing Research Report No. 409

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Marketing Service
Agricultural Economics Division

PREFACE

This report contains the results of economic and statistical research on overall trends and patterns of U. S. consumption of foods processed to varying degrees and in various ways. The body of the text describes the findings with minimum reference to definitions of terms, sources of data, detailed data, and procedures used. Such information is provided in the Appendix for those interested in particular areas of the research.

Historical data on changes in the extent of food processing used in this study were developed by Leva C. Taylor, statistical assistant. The subindexes of the Retail Food Price Index for relatively unprocessed foods and processed foods were developed by the Consumer Price Index Branch of the Bureau of Labor Statistics. Cross-section data on farm values and expenditures by stage and form of processing were calculated by the statistical staff of the Consumption Section, Statistical and Historical Research Branch, Agricultural Economics Division, Agricultural Marketing Service.

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SUMMARY OF MAJOR FINDINGS

(1) The proportion of the total civilian supply of farm foods commercially processed beyond the minimum degree necessary for retail sale as fresh or raw, as by canning, drying, curing, freezing, or baking, went up from 25 percent in 1925 to 35 percent in 1954. Over the same period, the proportion of the total supply of farm foods handled by marketing agencies rose from 80 percent to 91 percent.

(2) The greatest changes among forms or types of processing over the 30-year period were a ninefold increase in frozen foods and a 275-percent increase in total civilian use of canned foods. In contrast, the consumption of milled grains without further commercial processing into bread, other bakery products, or mixes decreased 40 percent in the 30-year period.

(3) Over the period covered, there appears to have been little relative difference between price changes at retail for relatively unprocessed foods, commonly described as fresh or raw, and those of all processed foods.

(4) Within each urbanization category, the per person use of all processed foods combined varied about as much with income as did the use of foods purchased in relatively unprocessed forms in spring 1955. Consumption of commercially frozen foods varied most with income of any of the major forms.

(5) Urban use of commercially canned foods in spring 1955 ran higher among higher-income households than among households at lower income levels, although the increase in all purchased foods was relatively greater for the latter group. Among rural nonfarm and farm households, purchases of canned foods also increased with income, but somewhat irregularly.

(6) Farm and rural nonfarm average expenditures in spring 1955 were much closer to the urban rates for all foods, for unprocessed foods, and for processed foods than in spring 1942.

(7) Changes in real income per capita from 1942 to 1955 apparently raised per capita quantities of purchased unprocessed foods and those of processed foods about 7 percent each. Increases in income clearly had more effect on consumption of frozen foods and perhaps on consumption of baked goods than on other processed forms.

(8) The very substantial change in urbanization which took place between 1942 and 1955 could not have increased purchases of relatively unprocessed foods, and of major processed forms of farm foods, more than 2 to 4 percent per capita.

(9) About two-thirds of the change in the quantity of farm foods purchased in canned form and four-fifths of the change in expenditures (in constant dollars) for such foods between 1942 and 1955 are not explainable by income and urbanization shifts. They reflect both changes in supplies and in consumer demand. Technological developments and marketing changes, such as increased availability in retail food stores, were far more important in increases in frozen food consumption than income and urbanization shifts.

(10) Per capita purchases of farm foods, measured in terms of farm resources used in food, may increase as much as 15 percent in the next 15 to 20 years on the basis of specified assumptions as to income, urbanization, and continued technological and social changes. Increases in per capita quantity and expenditure for processed foods for home consumption are likely to be half again as much as those for relatively unprocessed foods.

CONSUMPTION OF PROCESSED FARM FOODS IN THE UNITED STATES

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INTRODUCTION

Practically all farm foods now purchased by U. S. consumers have gone through some form of processing, varying from trimming, grading, and washing to factory preparation of elaborate dishes and meals. Within the total civilian supply of farm foods, the proportion handled by marketing agencies rose from 80 percent in 1925 to 91 percent in 1954. Meanwhile, the proportion of the total food supply commercially processed beyond the minimum degree necessary for retail sale as fresh or raw, as by canning, drying, curing, freezing, or baking, went up from 25 percent to 35 percent. 1/

Objectives

This report has the following five objectives: (1) To trace major trends in the processing of farm food commodities over the last 35 years; (2) to compare overall changes in average retail prices of relatively unprocessed and processed foods in recent decades; (3) to describe variations in the consumption of processed foods according to form and type, based on survey data for households grouped by region, urbanization, and income; (4) to evaluate factors related to changes in consumption of processed foods; and (5) to consider major elements in the outlook for processed foods.

In this study, primary concern is with variations in consumption of foods processed to varying degrees, not with the amounts or values of processing services added. 2/ Attention is focused on overall variations in

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1/ The dates of major Censuses of Manufactures established the benchmark years for the historical analysis. These are 1925, 1929, 1935, 1939, 1947, and 1954. Later information cannot be developed until all data from the 1958 Census of Manufactures are published.

2/ Historical data in this study differ from those in the recent report, Factory Production of Domestic Farm Food Products, a forthcoming Technical Bulletin by William H. Waldorf (22).* Data in the latter report measure changes in the output of manufactured food, in terms of value added, in constant prices, to domestic farm commodities only. In contrast, research findings in this report pertain to all commercial processing, whether by wholesalers, retailers, or in factories, and are based on quantities of foods combined in terms of farm and retail prices.

* Numbers in parentheses refer to Literature Cited, page 47.

consumption of commercially processed foods, both through time and at a given point in time, rather than on consumption of individual products. 3/ The subdivision of household expenditure data by stage and form of processing provides a measure of household purchases of processed foods, including all marketing services bought with them.

Data Used

Food data used in the study are drawn from (1) historical statistics on the supply and distribution of farm food commodities, supplemented by detailed Census and trade data for some commodities; (2) retail food price indexes of the Bureau of Labor Statistics; and (3) cross-section data in the form of statistics on use of purchased food reported by households in nationwide surveys in spring 1942 and spring 1955.

Stages of Processing

For some economic analyses, the great variety of forms of processing requires grouping; in this study the forms are grouped within four stages of processing. (See Exhibit A for a guide to the coverage of each stage.) The first stage includes those forms of processing needed to prepare foods for sale in retail stores in the least processed form possible. These products are often described as fresh or raw foods.

The second stage or degree of processing covers all additional processing of single commodities, as by canning, quick freezing, drying and curing, and the manufacturing of butter, cheese, margarine, and shortening.

The preparation of all older mixed foods is identified for this study, as being the third stage. These include canned soups and mixtures of many kinds, such as all baked goods, ice cream, and the older flour mixes, as for biscuits and pancakes.

A fourth stage has been established to identify the processing of newer mixed foods, often called "convenience foods." The term convenience foods as used here includes only mixed foods and excludes fluid milk and even sliced bread. The criterion for differentiation between the third and fourth stages is the recency in development or extensive marketing of the new prepared food, or since World War II. 4/

3/ Such details may be studied by means of information in the Censuses of Manufactures (16), in reports of the Agricultural Estimates Division of AMS, and with data contained in Agr. Handb. 62, Consumption of Food in the United States, 1909-52 and its annual supplements (10).

4/ The estimates for the fourth stage are subject to a downward bias because of the inevitable lag in establishment of a reporting system for new commodities.

Exhibit A.--Classification of foods by stage of processing 1/

First stage -- relatively unprocessed	Second stage -- processed single commodities	Third stage -- older mixed foods	Fourth stage -- newer mixed foods
Fresh meat	Canned meat Cured and dried meat Other prepared meat-- e.g. sausage, bologna Frozen meat	Mixed meat dishes - e.g. stews, hash, chili	Prepackaged frozen items - e.g. meat pies, TV dinners
New York dressed and eviscerated poultry	Canned poultry 2/ Quick frozen poultry		Frozen dishes - e.g. pot pies
Shell eggs		Egg content of bakery products, salad dressings, etc.	Egg content of new mixes, as for cakes
Fluid whole milk	Condensed and evaporated milk Dried milks Other - butter, cheese, skim milk, buttermilk, etc.	Frozen dairy products - e.g. ice cream Milk in baked goods and confections	
Lard and vegetable oils sold as such	Shortening Margarine	Fats and oils in bakery products, salad dressings, confections, older flour mixes, potato chips	Fats and oils in newer mixes, as for cakes
Peanuts in shell, shelled or salted	Peanut butter	Peanuts in confections	
Treenuts in shell, shelled or salted		Nut content of confections	
Fresh fruit	Canned fruits and juices, except baby foods Frozen fruits Dried fruits	Fruit content of bakery products, jams and jellies	Canned fruit baby foods
Fresh vegetables	Canned vegetables including soups 3/ Frozen		Canned vegetable baby foods
Fresh potatoes	Canned potatoes Potato flour	Potato content of hash, stews Potato chips	Frozen french fries

See footnotes at end of exhibit.

Continued

Exhibit A.--Classification of foods by stage of processing [1] -Continued

First stage -- relatively unprocessed	Second stage -- processed single commodities	Third stage -- older mixed foods	Fourth stage -- newer mixed foods
Fresh sweetpotatoes	Canned sweetpotatoes		
Dry beans, peas and cowpeas	Canned beans	Content of beans and franks, chili, soups	
Wheat cereals to be cooked		Ready-to-serve wheat breakfast cereals	
Wheat flour sold as such	Macaroni and spaghetti	Wheat used in bakery products, egg noodles, older flour mixes	Wheat content of newer flour mixes
Rye and buckwheat flour		Grain in pancake mix and bakery products	
Pearl barley		Malt foods	
Popcorn Cornmeal and flour Hominy grits	Cornstarch and sirup Corn sugar in frozen and canned fruits [4]	Ready-to-serve corn breakfast cereals Corn sugar and sirup in confections	Corn chips
Milled rice		Ready-to-serve rice breakfast cereals	
Oatmeal Oat infant food		Ready-to-serve oat breakfast cereals	
Cane and beet sugar sold as such	Sugar in canned and bottled foods, frozen fruits	Sugar in confections, bakery products, ice cream, soft drinks	Sugar content of newer flour mixes
Honey Maple sugar and sirup			
Sorgo, sugarcane and refiners sirup Molasses		Sirup content of bakery products, confections, etc.	
Tea Roasted, ground coffee	Instant coffee		
Cocoa		Cocoa in confections	

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[1] Covers only farm foods handled commercially. [2] Includes relatively small quantities going into mixed foods because data necessary for separation were not available. [3] Vegetable content of soups should have been classified in third stage but relatively minor quantities involved. [4] This classification followed from classification of canned and frozen fruits in second stage.

To meet the needs of food marketing agencies interested in individual forms of processing and in commodity detail, some of the sets of data on the stages of processing for this report have been subdivided into the major processed forms. In the first stage, slaughtering, sorting and packaging, milling, and refining are identified. Within the second, third, and fourth stages are canning, freezing, curing and drying, baking, and other forms. The category, "other processing," includes a variety of products -- ready-to-eat meats, sausage, cheese, mayonnaise or salad dressing, macaroni and noodles, confectionery, prepared mixes, potato and corn chips, and jams and jellies.

HISTORICAL CHANGES IN THE EXTENT OF PROCESSING OF FARM FOODS

Annual data on the consumption of many foods in relatively unprocessed and processed forms are available, but significant gaps in information for some foods can be filled only from the Censuses of Manufactures. [5] Therefore, the following discussion of historical changes is based on information for the benchmark years 1925, 1929, 1935, 1939, 1947, and 1954. These changes are measured in terms of farm level values of domestic and imported farm commodities consumed by U. S. civilians using 1947-49 farm prices with a few minor exceptions. Thus, the study is concerned primarily with the overall quantities of food processed.

Changes in Relative Importance of Stages of Processing

The first finding based on analysis of data in table 1, pertaining to stages of processing, is the marked decrease in the relative significance of production for home use and of farmer processing for sale, especially since 1939. These decreases have been offset by increases in commercial processing beyond the minimum necessary for sale as fresh or raw, from 25 percent in 1925 to 35 percent in 1954. There has been practically no change in the relative importance of commercially supplied fresh or raw foods in the total civilian food picture (fig. 1). But there has been a slight decline in the relative importance of these fresh foods in the total quantity of food moving through commercial channels, from 69 percent in 1925 to 62 percent in 1954. The 52 percent increase in the total volume of fresh or raw food handled commercially for civilian food use is to be compared with the 37 percent increase in the civilian population from 1925 to 1954.

Most of the increase in the relative importance of the second stage of processing occurred between 1947 and 1954. For the third stage, which encompasses the older types of mixed foods, the peak among the benchmark years was in 1947. There has been some reduction since 1947 owing to the decline in the relative importance of commercial baking. By definition the fourth stage includes modern convenience foods so it could not become important until recent years.

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[5] Sources of basic data, procedures used in developing the statistics for this section, and problems with the basic data are described in the Appendix. Some related production data for domestic farm foods only are given in tables 8-10, following the text of the Appendix.

The following observations on changes in total civilian use of major commodities in the several stages of processing are based on analysis of table 2. (See also fig. 2.) In the case of meat animals, commercial slaughter without further significant processing increased about a half from 1925 to 1954, but the consumption of canned, cured, and quick frozen items rose 70 percent or more. The use of meats in prepared mixed foods still appears to be relatively small.

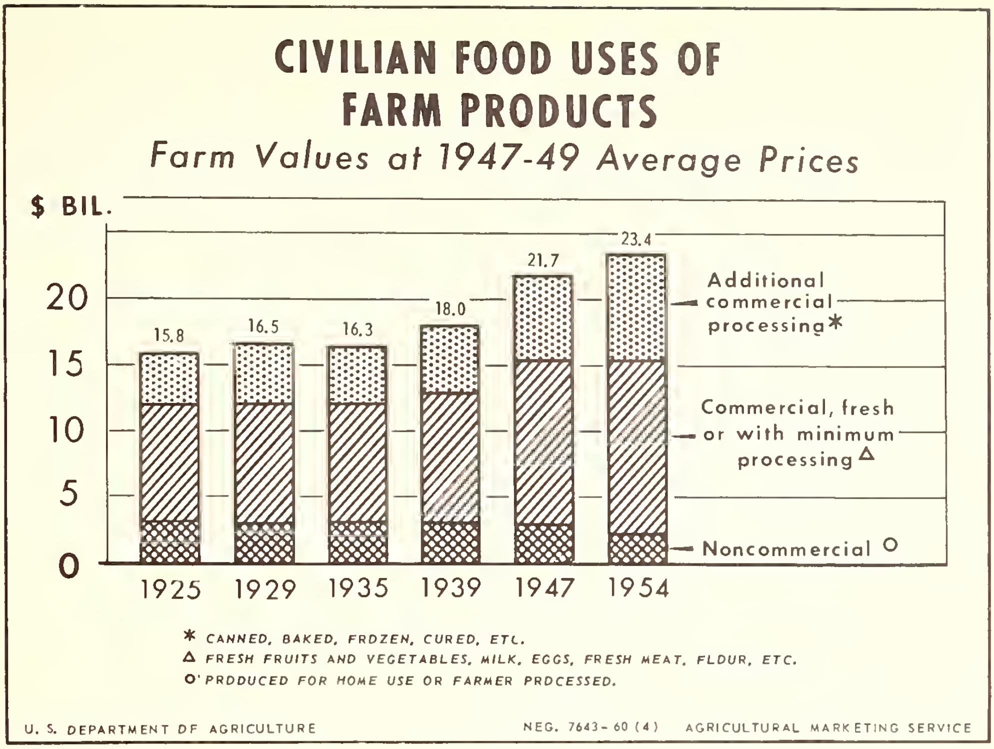
The total quantity of poultry moving through commercial channels rose 240 percent in the 30-year period. Available information indicates that about a fourth of total consumption of poultry in 1954 was marketed in canned or frozen forms. 6/ The commercial handling of eggs increased about three-fourths from 1925 to 1954. Practically all dried and frozen eggs are purchased by consumers as part of the content of mixed foods. Apparently, in 1954 a smaller proportion of all eggs purchased by consumers was in the several more processed forms than in 1939 and 1947. The newer mixes appear to have substituted to some extent for commercial bakery products, but the consumption of processed mixed foods including eggs seems to have declined slightly in relative terms.

Commercial handling of milk has about doubled, with the greatest increases in the fluid milks and ice cream. The declines in the consumption rates for evaporated milk and butter have been reflected in the levelling off in the importance of the second stage of processing in the dairy-product picture for recent years. The most significant changes in fats and oils are the increases in their use in mixed foods and, of course, the extensive development of the market for shortening and margarine.

Total civilian purchases of fresh fruits and tree nuts have risen only about a third over the 30-year period, somewhat less than the 37 percent increase in the civilian population. But frozen and canned fruits have continued to rise in relative importance, and the 1954 total for all fruits and tree nuts handled through commercial channels was 64 percent above the aggregate for 1925.

The commercial handling of vegetables, potatoes, sweetpotatoes, beans and peas increased about 50 percent from 1925 to 1954. The rise in the total of these foods handled for the fresh market was only about half as much as the increase in the civilian population, apparently largely due to the decline in the consumption of potatoes, sweetpotatoes, and dry beans. The quantity of these items purchased after having been processed in the several forms of the second stage more than doubled.

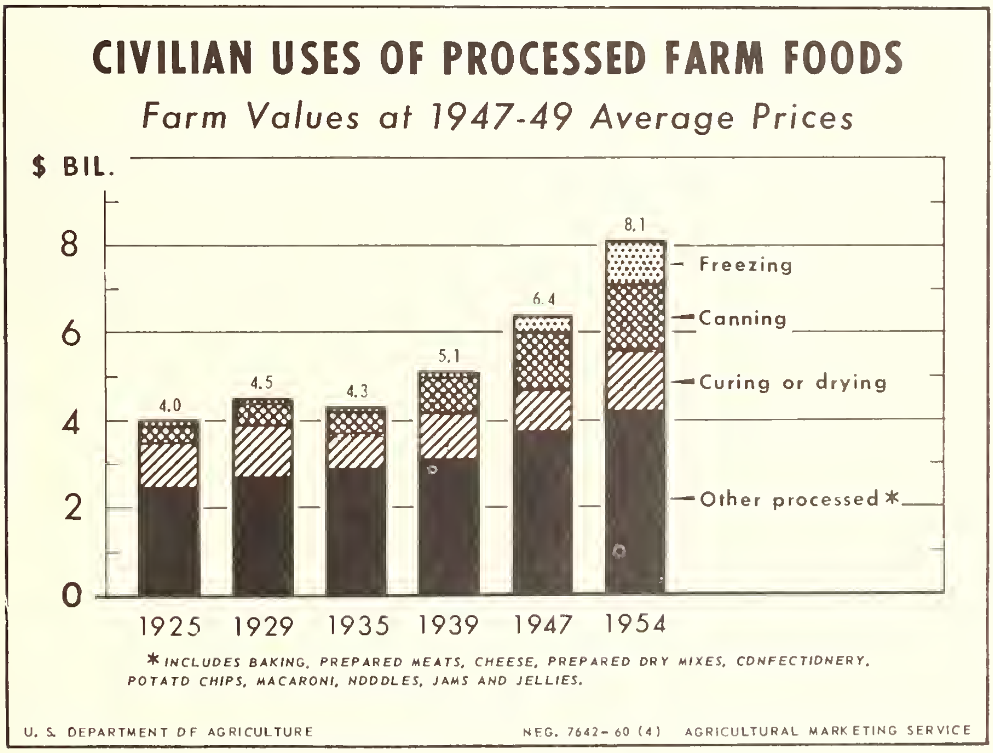
6/ Some of this poultry was finally purchased in canned mixed foods such as soups and chicken and noodles, but data necessary for measuring such quantities are lacking.



* CANNED, BAKED, FROZEN, CURED, ETC.
△ FRESH FRUITS AND VEGETABLES, MILK, EGGS, FRESH MEAT, FLOUR, ETC.
○ PRODUCED FOR HOME USE OR FARMER PROCESSED.

U. S. DEPARTMENT OF AGRICULTURE NEG. 7643-60 (4) AGRICULTURAL MARKETING SERVICE

Figure 1



* INCLUDES BAKING, PREPARED MEATS, CHEESE, PREPARED DRY MIXES, CONFECTIONERY, POTATO CHIPS, MACARONI, NOODLES, JAMS AND JELLIES.

U. S. DEPARTMENT OF AGRICULTURE NEG. 7642-60 (4) AGRICULTURAL MARKETING SERVICE

Figure 2

The total quantity of grain products consumed by civilians was almost the same in 1947 and 1954 as that in 1925 and 1929. Accordingly, the relative importance of grain products among all commercially handled farm foods for civilian use declined from 9 percent in 1925 to about 5 percent of their farm value in 1954 (measured in 1947-49 dollars). The decrease in the consumption of flour and meal was approximately offset by increases in bakery products and prepared mixes.

The aggregate quantity of sugars and sirups purchased by civilian consumers increased only a little from 1925 to 1954. The decline in purchases of refined sugar as such was slightly more than offset by greater purchases of sugar included in ice cream, bakery products, jams and jellies, and confections. Increases in commercially processed beverages (nonalcoholic) exceeded the increase in the population from 1925 to 1954, but the rate of increase levelled off between 1947 and 1954. The second stage for 1954 includes the consumption of instant coffee, which requires additional processing beyond the ordinary roasting and grinding of coffee beans.

Changes in Significance of Types of Processing

As indicated by the data in table 3, the relative importance of the major types of processing has changed over the last 30 years. For this table and several of the others, commodity data have been grouped according to the most extensive form of processing. For example, the production of canned meat had to be preceded by slaughter, but its canned value had to be excluded from the value under slaughtering and included with canning in order to avoid duplication. The most significant change indicated from 1925 to 1954 was the ninefold increase in frozen foods resulting from the technological developments and from construction and installation of the necessary marketing facilities for their handling. The total quantity of foods canned rose 275 percent, partly because additional types of foods have been canned. In contrast, the consumption of milled grains without further commercial processing into bread, other bakery products, or mixes decreased 40 percent in the 30-year period.

Table 1.--U. S. civilian food use of farm foods subdivided by stage of processing, approximate farm values at 1947-49 prices, selected years 1/

Stage of processing	Approximate farm values at 1947-49 prices						Percentage distribution					
	1925	1929	1935	1939	1947	1954	1925	1929	1935	1939	1947	1954
	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Total civilian food use 2/	15,848	16,498	16,297	18,017	21,663	23,377	100.0	100.0	100.0	100.0	100.0	100.0
Produced for home use	2,839	2,723	2,837	2,859	2,586	1,921	17.9	16.5	17.4	15.9	12.0	8.2
Farmer processed for sale	326	278	276	260	268	165	2.1	1.7	1.7	1.4	1.2	.7
Commercial - total handled	12,683	13,497	13,184	14,898	18,809	21,291	80.0	81.8	80.9	82.7	86.8	91.1
First stage	8,695	8,965	8,888	9,758	12,402	13,222	54.9	54.3	54.6	54.2	57.2	56.5
Second stage	3,117	3,521	3,328	4,001	4,625	6,136	19.6	21.4	20.4	22.2	21.4	26.3
Canned	399	480	539	739	1,250	1,422	2.5	2.9	3.3	4.1	5.8	6.1
Frozen	3	5	4	13	111	630	3/	3/	3/	.1	.5	2.7
Cured and dried	1,034	1,176	749	1,089	978	1,377	6.5	7.2	4.6	6.0	4.5	5.9
Other	1,681	1,860	2,036	2,160	2,286	2,707	10.6	11.3	12.5	12.0	10.6	11.6
Third stage	871	1,011	968	1,137	1,773	1,770	5.5	6.1	5.9	6.3	8.2	7.6
Canned	3	3	7	14	52	69	3/	3/	3/	.1	.2	.3
Frozen	102	118	95	134	294	323	.7	.7	.6	.7	1.4	1.4
Baked	479	588	553	678	929	844	3.0	3.6	3.4	3.8	4.3	3.6
Other	287	302	313	311	498	534	1.8	1.8	1.9	1.7	2.3	2.3
Fourth stage 4/	---	---	---	2	9	163	---	---	---	3/	3/	.7

1/ Estimates based on Bureau of the Census, AMS, and trade data. Stages of processing described in text and outlined in Exhibit A. Statistical data are comparable to those of the supply-utilization index.

2/ These totals differ from the value of civilian food use published in Agr. Handb. 91 by less than 1 percent for any year. Differences are due to refinement of prices and conversions in the process of this research.

3/ Less than 0.05 percent.

4/ In 1939 and 1947 all canned; in 1954, $15 million canned, $39 million frozen, and $109 million other.

Table 2.--Civilian food use of major groups of farm commodities handled commercially, subdivided by stage of processing, valued at 1947-49 farm prices, selected years 1/

Commodity group and stage of processing	1925	1929	1935	1939	1947	1954
	Million dollars	Million dollars	Million dollars	Million dollars	Million dollars	Million dollars
Total handled commercially	12,683	13,497	13,184	14,898	18,809	21,291
Meat animals	4,674	4,646	4,338	5,149	6,804	7,705
First	3,191	2,879	2,948	3,299	4,602	4,810
Second	1,480	1,764	1,387	1,842	2,152	2,809
Third	3	3	3	8	50	60
Fourth	---	---	---	---	---	26
Poultry	496	518	531	644	1,054	1,687
First	496	518	531	634	970	1,224
Second 2/	---	---	---	10	84	455
Third	---	---	---	---	---	---
Fourth	---	---	---	---	---	8
Eggs	1,004	1,139	957	1,104	1,606	1,778
First	938	1,052	860	962	1,402	1,576
Second	----	---	---	---	---	---
Third	66	87	97	142	204	129
Fourth	---	---	---	---	---	73
Dairy products	1,743	2,062	2,151	2,430	2,998	3,398
First	603	807	807	919	1,463	1,729
Second	1,013	1,090	1,208	1,336	1,204	1,299
Third	127	165	136	175	331	370
Fourth	---	---	---	---	---	---
Fats and oils 3/	519	583	643	671	721	893
First	247	275	263	292	193	273
Second	184	191	256	196	248	336
Third	88	117	124	183	280	276
Fourth	---	---	---	---	---	8
Fruit and tree nuts	743	806	918	1,032	1,191	1,216
First	561	623	716	782	820	746
Second	127	132	153	213	325	418
Third	55	51	49	37	42	44
Fourth	---	----	---	---	4	8
Vegetables and vegetable type crops 4/	1,270	1,388	1,360	1,434	1,724	1,881
First	1,035	1,143	1,108	1,109	1,260	1,246
Second	235	245	248	311	440	585
Third	---	---	4	12	19	38
Fourth	---	---	---	2	5	12
Grains	1,119	1,172	1,008	1,069	1,123	1,128
First	666	636	553	571	398	402
Second	66	85	60	72	129	108
Third	387	451	395	426	596	598
Fourth	---	---	---	---	---	20
Sugars and sirups	528	482	476	476	550	571
First	426	372	358	327	303	326
Second	12	14	16	21	43	45
Third	90	96	102	128	204	192
Fourth	---	---	---	---	---	8
Beverages	548	658	767	849	995	981
First	494	619	711	825	950	840
Second	---	---	---	---	---	81
Third	54	39	56	24	45	60
Fourth	---	---	---	---	---	---
Miscellaneous 5/	39	43	35	40	43	53
First	38	41	33	38	41	50
Second	---	---	---	---	---	---
Third	1	2	2	2	2	3
Fourth	---	---	---	---	---	---

1/ Stages described in text. The first stage includes the simplest forms of processing of foods for sale in retail stores as fresh or raw. 2/ Includes relatively small quantities going into mixed foods because data necessary for separation were not available. 3/ Includes edible peanuts. 4/ Vegetables, potatoes, sweetpotatoes, dry beans and peas, and cowpeas. 5/ Popcorn, mustard seed, and honey.

Table 3.--Civilian food use of major groups of farm commodities, subdivided by type of processing, valued at 1947-49 farm prices, selected years

Year and commodity group	Relatively unprocessed 1/				With additional processing 2/					Total
	Slaughtered	Sorted, packaged	Milled	Refined	Canned	Frozen	Cured, dried	Baked	Other processed 3/	
	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.
1925										
Total handled commercially	3,687	3,717	666	625	402	105	1,034	479	1,968	12,683
Meat animals	3,191	---	---	---	28	---	954	---	501	4,674
Poultry	496	---	---	---	---	---	---	---	---	496
Eggs	---	938	---	---	---	---	---	62	4	1,004
Dairy products	---	603	---	---	77	96	1	23	943	1,743
Fats and oils	---	48	---	199	---	---	---	62	210	519
Fruits and tree nuts	---	561	---	---	47	2	79	2	52	743
Vegetables and vegetable type crops 4/	---	1,035	---	---	235	---	---	---	---	1,270
Grains	---	---	666	---	3	2	---	299	149	1,119
Sugars and sirups	---	---	---	426	12	5	---	31	54	528
Beverages	---	494	---	---	---	---	---	---	54	548
Miscellaneous 5/	---	38	---	---	---	---	---	---	1	39
1929										
Total handled commercially	3,397	4,338	636	594	483	123	1,176	588	2,162	13,497
Meat animals	2,879	---	---	---	81	---	1,098	---	588	4,646
Poultry	518	---	---	---	---	---	---	---	---	518
Eggs	---	1,052	---	---	---	---	---	80	7	1,139
Dairy products	---	807	---	---	85	112	3	43	1,012	2,062
Fats and oils	---	53	---	222	---	---	---	75	233	583
Fruits and tree nuts	---	623	---	---	55	3	75	3	47	806
Vegetables and vegetable type crops 4/	---	1,143	---	---	245	---	---	---	---	1,388
Grains	---	---	636	---	3	3	---	347	183	1,172
Sugars and sirups	---	---	---	372	14	5	---	40	51	482
Beverages	---	619	---	---	---	---	---	---	39	658
Miscellaneous 5/	---	41	---	---	---	---	---	---	2	43

See footnotes at end of table.

Continued-

Table 3.--Civilian food use of major groups of farm commodities, subdivided by type of processing, valued at 1947-49 farm prices, selected years - Continued

Year and commodity group	Relatively unprocessed 1/				With additional processing 2/					Total
	Slaughtered	Sorted, packaged	Milled	Refined	Canned	Frozen	Cured, dried	Baked	Other processed 3/	
	Mil. dol.	Mil. dol.	Mil. dol..	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.
1935										
Total handled commercially	3,479	4,289	553	567	546	99	749	553	2,349	13,184
Meat animals	2,948	---	---	---	91	---	668	---	631	4,338
Poultry	531	---	---	---	---	---	---	---	---	531
Eggs	---	860	---	---	---	---	---	87	10	957
Dairy products	---	807	---	---	111	89	6	37	1,101	2,151
Fats and oils	---	54	---	209	---	---	---	76	304	643
Fruits and tree nuts	---	716	---	---	76	3	75	2	46	918
Vegetables and vegetable type crops 4/	---	1,108	---	---	252	---	---	---	---	1,360
Grains	---	---	553	---	1	1	---	312	141	1,008
Sugars and sirups	---	---	---	358	15	6	---	39	58	476
Beverages	---	711	---	---	---	---	---	---	56	767
Miscellaneous 5/	---	33	---	---	---	---	---	---	2	35
1939										
Total handled commercially	3,933	4,682	571	572	755	147	1,089	678	2,471	14,898
Meat animals	3,299	---	---	---	158	---	999	---	693	5,149
Poultry	634	---	----	---	10	---	---	---	---	644
Eggs	---	962	---	---	---	---	---	131	11	1,104
Dairy products	---	919	---	---	126	125	7	42	1,211	2,430
Fats and oils	---	47	---	245	---	---	---	115	264	671
Fruits and tree nuts	---	782	---	---	125	6	83	2	34	1,032
Vegetables and vegetable type crops 4/	---	1,109	---	---	314	5	---	---	6	1,434
Grains	---	---	571	---	2	2	---	345	149	1,069
Sugars and sirups	---	---	---	327	20	9	---	43	77	476
Beverages	---	825	---	---	---	---	---	---	24	849
Miscellaneous 5/	---	38	---	---	---	---	---	---	2	40

See footnotes at end of table.

Continued-

Table 3.--Civilian food use of major groups of farm commodities, subdivided by type of processing, valued at 1947-49 farm prices, selected years -Continued

Year and commodity group	Relatively unprocessed 1/				With additional processing 2/					Total
	Slaughtered	Sorted, packaged	Milled	Refined	Canned	Frozen	Cured, dried	Baked	Other processed 3/	
	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.
1947										
Total handled commercially	5,572	5,983	398	449	1,311	405	978	929	2,784	18,809
Meat animals	4,602	---	---	---	354	5	890	---	953	6,804
Poultry	970	---	---	---	28	56	---	---	---	1,054
Eggs	---	1,402	---	---	---	---	---	186	18	1,606
Dairy products	---	1,463	---	---	215	274	25	47	974	2,998
Fats and oils	---	47	---	146	---	---	---	158	370	721
Fruits and tree nuts	---	820	---	---	252	17	63	3	36	1,191
Vegetables and vegetable type crops 4/	---	1,260	---	---	419	30	---	---	15	1,724
Grains	---	---	398	---	3	3	---	472	247	1,123
Sugars and sirups	---	---	---	303	40	20	---	63	124	550
Beverages	---	950	---	---	---	---	---	---	45	995
Miscellaneous 5/	---	41	---	---	---	---	---	---	2	43
1954										
Total handled commercially	6,034	6,231	402	555	1,506	992	1,377	844	3,350	21,291
Meat animals	4,810	---	---	---	428	54	1,264	---	1,149	7,705
Poultry	1,224	---	---	---	70	393	---	---	---	1,687
Eggs	---	1,576	---	---	---	---	---	113	89	1,778
Dairy products	---	1,729	---	---	215	300	48	54	1,052	3,398
Fats and oils	---	44	---	229	---	---	---	142	478	893
Fruits and tree nuts	---	746	---	---	231	133	65	4	37	1,216
Vegetables and vegetable type crops 4/	---	1,246	---	---	520	83	---	---	32	1,881
Grains	---	---	402	---	3	3	---	474	246	1,128
Sugars and sirups	---	---	---	326	39	26	---	57	123	571
Beverages	---	840	---	---	---	---	---	---	141	981
Miscellaneous 5/	---	50	---	---	---	---	---	---	3	53

1/ The minimum amounts of processing required for retail sale as fresh or raw products (stage 1). 2/ Stages 2-4. 3/ Such as ready-to-eat meats, sausages, cheese, mayonnaise and salad dressings, macaroni and noodles, confectionery, prepared mixes, potato and corn chips, malt food products, and jams and jellies. 4/ Vegetables, potatoes, sweetpotatoes, dry beans and peas, and cowpeas. 5/ Popcorn, mustard seed, and honey.

CHANGES IN PRICES OF RELATIVELY UNPROCESSED AND PROCESSED FOODS

A subject of much interest to agricultural groups and to food marketing people is the question whether retail prices of processed foods have risen more than the prices of so-called "fresh" or relatively unprocessed foods have been raised by higher costs of marketing those foods. The results of two approaches to this question are demonstrated by the data for selected years in table 4.

The first approach involved the division of the Retail Food Price Index 7/ into subindexes for "fresh" or relatively unprocessed foods (the first stage) and for processed foods included in the second, third, and fourth stages, described earlier. This involved the use of the regular BLS expenditure weights to combine prices of individual foods following the general procedure of the Bureau of Labor Statistics in constructing its food price indexes.

A second approach was devised in order to appraise the possible significance of the BLS weight revisions 8/ on the indexes of retail prices for relatively unprocessed and for processed foods (first approach). Special price indexes were developed using the 1955 urban household food survey data on expenditures as fixed weights for all years to combine the BLS item price indexes.

Findings Based on BLS Expenditure Weights

The BLS subindexes for 1935, 1939, 1947, and 1954 in table 4 indicate that the prices of all relatively unprocessed and all processed foods went up by about the same degree from 1939 to 1954. But the prices of processed foods had fallen more from 1935 to 1939 than those of unprocessed items. The relationship of changes in prices of processed foods to changes in prices of fresh or relatively unprocessed foods between 1939 and 1954 was maintained by the substantially greater increase in prices for bakery products than for flour and the like. The prices of processed cereal products (including bakery products and prepared breakfast foods) and dairy products rose more than those for other food groups. Cheese and butter prices were up significantly more than the prices for fresh milks. In contrast, there was much less increase in the prices of processed fruits and vegetables and other such foods from 1935 and 1939 to 1954 than in the prices of fresh or relatively unprocessed items.

Changes Based on 1955 Expenditure Weights

The overall picture of price changes from 1935 to 1954, indicated for the unprocessed and processed categories of foods by the measure developed in the second approach (1955 survey data as fixed weights and BLS price indexes for commodities), was practically the same as that revealed by the first

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7/ By technicians of the Consumer Price Index Branch of the Bureau of Labor Statistics.

8/ Revised weights were introduced in 1935, 1950, and 1953, based on family expenditures in 1934-36, 1947-49, and 1950, respectively.

Table 4.--Alternative estimates of retail price changes for relatively unprocessed and processed farm foods, selected years 1/

(Index 1947-49=100)

Commodity group and form	Subindexes of BLS retail food price index 2/				Approximate price relationships using BLS retail prices and spring 1955 urban expenditures as weights 3/					
	1935	1939	1947	1954	1925	1929	1935	1939	1947	1954
All farm foods 4/										
Relatively unprocessed	49	47	95	111	68	68	49	47	94	111
Processed	54	50	99	110	70	72	55	50	98	112
Cereals and bakery products										
Relatively unprocessed	63	52	98	109	67	58	56	45	98	108
Processed	61	59	93	126	72	67	64	58	95	124
Meats and poultry										
Relatively unprocessed	44	44	92	102	51	57	44	43	92	101
Processed	50	43	104	103	55	57	48	43	100	107
Dairy products 5/										
Relatively unprocessed	56	57	94	112	66	68	56	58	94	112
Processed	44	41	100	98	66	67	47	45	97	104
Fruits and vegetables 6/										
Relatively unprocessed	46	44	96	113	90	82	46	45	96	113
Processed	63	55	105	104	84	79	60	53	103	108
Other foods 7/										
Relatively unprocessed	54	48	99	121	82	78	54	48	97	131
Processed	60	56	104	91	72	89	53	49	99	114

1/ Represents the price change for foods consumed at home. Relatively unprocessed foods are defined as those requiring the least possible processing for retail sale to consumers as fresh or raw (stage 1). Processed foods are those requiring additional processing over the "unprocessed" form. (See text.)

2/ Computed by the Bureau of Labor Statistics, using data accumulated for their Retail Food Price Index.

3/ Derived by adjusting the value of purchased foods in a week in spring 1955, obtained in the 1955 Survey of Household Food Consumption, by the annual average retail price indexes of the Bureau of Labor Statistics for individual items.

4/ Excludes fish and alcoholic beverages.

5/ Includes butter.

6/ Includes potatoes.

7/ Includes partially prepared foods, condiments and sauces, nonalcoholic beverages, fats and oils (except butter), sugars and sweets, eggs, and miscellaneous foods.

approach with BLS expenditure weights. There was a little more change in the flour and meal subgroup (classified as relatively unprocessed) with the 1955 weights than indicated by the BLS weights which reduced their importance. There was also somewhat greater increase with the 1955 weights for processed meats and poultry, fruits and vegetables, and "other foods" than indicated by the subindexes with BLS weights. The substantial difference in results for the "other food" category reflects the more detailed weights available from the 1955 survey and the reduced importance of the price decline in vegetable fats and oils in the second approach.

Data available for use with the second approach permitted the carrying of subindexes back to 1925. 9/ Even for this longer period, little difference is seen between the price changes for "fresh" or relatively unprocessed foods and those for all processed foods. The greatest relative price changes occurred for fresh and processed meat and poultry groups which practically doubled in price compared with the 60 to 63 percent increases for all unprocessed and all processed foods. From 1925 to 1954 the smallest relative price increase was that for fruits and vegetables. Prices of fluid milk rose more over the longer period than the prices of processed dairy products, in contrast with the reverse situation from 1939 to 1954.

Looking just at the post-World War II period, we note that the greatest increases were in prices of the "unprocessed other" category and of bakery products. The former were caused by peak coffee prices in 1954. As between the results of the two approaches, the significant difference for the "other food" category is partly owing to the separation of data for instant coffee from those for regular coffee, made possible in AMS calculations by greater commodity detail in the 1955 survey data which could be used as weights. The less detailed weights for 1947 and 1954 used in the BLS computations gave much greater influence to the decline in prices of vegetable fats and oils.

Further Research Underway

A very interesting phase of the general cost problem is currently being studied in a joint project of the Institute of Home Economics, and the Market Development Research and Marketing Economics Research Divisions of AMS. This research is concerned with time requirements for kitchen preparation and marketing charges for several degrees of preparation of individual foods and dishes bought by domestic consumers. 10/

9/ Complications with linking periods of changing weights for the BLS indexes were so great for earlier years that the calculations were not carried back of 1935.

10/ Two forerunners of this much more elaborate study were (1) the time and cost study reported by the Institute of Home Economics in 1953 in Weiss, Gertrude S. "Time and Money Costs of Meals Using Home- and Prekitchen-Prepared Foods" (23); (2) a pilot study of costs of convenience foods reported in Harris, Roland G. and Dwoskin, Philip B. "Convenience Foods and their Costs to Consumers," Marketing and Transportation Situation. July 1958, pp. 27-33 (5).

VARIATIONS AMONG GROUPS OF HOUSEHOLDS IN CONSUMPTION OF PURCHASED FOODS

At the outset of this discussion of variations in the consumption of purchased "fresh" or relatively unprocessed and processed farm foods by form and type, it should be noted that these variations are in the consumption of food at home among U. S. households grouped by urbanization, income, and region. The only usable indications of away-from-home use of individual foods and forms of foods are from a survey of the school lunch program in 1957-58 11/ and a survey of employee food services in large manufacturing plants in 1956. 12/ Because these two types of away-from-home eating places account for only a small part of the total, their food patterns are not discussed here.

There are several alternative approaches to the study of variations in fresh and processed food consumption among household groups. For this study, only purchased foods are considered, excluding foods produced for home use. Consumption of purchased foods can be measured in terms of the farm commodities by using farm values 13/ or in terms of expenditures for food at home, which represent the retail values of purchased foods. For this study, farm value data have been reassembled by stage and form of processing. They are summarized in table 5. Expenditures per person in the spring of 1942 (on an annual basis) are tabulated in table 6 for U. S. households by urbanization and income. 14/ Comparable data for spring 1955 are in table 7. 15/ These tables are collected at the end of this section.

Variations in Farm Values by Form of Processing

Data in table 5 show how the consumption per person of major forms of purchased foods, measured in terms of farm values, varied in spring 1955 among households grouped by urbanization and income.

11/ Use of processed foods by public schools is reported in Anderson, Kenneth E. and Hoofnagle, William S. The Market for Food in Public Schools. Mktg. Res. Rept. 377 (1).

12/ Information on use of processed foods in employee food services is given in Lifquist, Rosalind C. Buying Practices and Food Use of the Employee Food Services in Manufacturing Plants. Mktg. Res. Rept. 326 (8).

13/ The farm value data were originally developed, using 1947-49 farm prices and quantity data from the 1955 Household Food Survey, as part of the construction of the cross-section indexes of food consumption. They were described in the article "Introduction of New Regional Indexes for Food Consumption Analysis," National Food Situation, July 1959 (7).

14/ From Misc. Pub. 550 Family Food Consumption in the United States, Spring 1942 (17).

15/ From Household Food Consumption Survey 1955 Report 1 (19).

By Urbanization Group.- Farm household use of purchased farm foods averaged about half that of nonfarm households, reflecting differences primarily in purchases of livestock products. Farm households buy substantially smaller proportions of foods in the fresh form, because many have home-produced supplies of milk, meat, eggs, fruits, and vegetables. Farm usage of commercially processed foods is generally at much lower levels than the rates for rural nonfarm and urban households.

By Income Group.- Within each urbanization the per person use of all processed foods combined varied about as much with income as did the use of foods bought in relatively unprocessed forms in spring 1955. The use of frozen foods varied most with income of any of the major forms. Among urban households, there was some increase in consumption rates from the lowest to the middle income groups for canned, baked, and the "other" categories. But consumption rates varied relatively little from the middle income groups to the higher income groups. The use of dried and cured foods apparently decreased slightly with income. Among rural nonfarm and farm households, there was a substantial increase in average use of most forms of purchased processed foods from those in the lower range of income to higher income levels, partly reflecting the decrease in home production.

In spring 1955 urban use of canned foods ran higher among higher income households than among lower income levels. However, the increase for all purchased foods was greater so that the proportion of canned in the total declined at the upper end of the income scale. Among households in the other two urbanization categories, purchases of canned foods also increased with income, but the patterns were somewhat erratic.

Variations in Farm Values by Stage of Processing

In a discussion of variations in farm values of purchased foods in spring 1955, subdivided by stage of processing, it is well to recall that food consumption patterns of low-income rural nonfarm households resemble those of farm households, whereas high-income rural nonfarm households' food patterns resemble urban patterns.

For all forms of processed single commodities combined, the second stage, the lowest income group of rural nonfarm households used less per person than did the lowest income group of urban households. Urban and rural nonfarm households of the middle and higher income groups had quite similar patterns, and the rates of consumption varied relatively little with income.

Among the forms of processed foods grouped within the second stage, use of frozen foods rose markedly with income level for all urbanizations. Use of cured and dried foods in urban households decreased with income, whereas such use by rural nonfarm households increased at successively higher income levels. Farm purchases of cured and dried foods were generally lower than those by rural nonfarm or urban households.

All urbanizations showed considerable "income elasticity" in their use of the older prepared foods, the third stage, which includes jams, jellies, mayonnaise and salad dressings, candy, ready-to-eat cereals, and the older flour mixes. 16/ Middle- and higher-income urban and rural nonfarm households bought about the same quantities of these foods. Farm purchases were on a lower level, but there was evidence of considerable increase from low to high income levels.

Average urban use of the newer prepared foods, grouped in the fourth stage of processing, was twice as high as the rate of use by farm households. The rural nonfarm level of use was somewhat lower than the urban. Among these foods consumption was much more income-elastic than among other stages of processing.

Variations in Household Expenditures in Spring 1942

Differences in Patterns by Form.- Households in the three urbanization categories differed substantially in their expenditures for all foods combined, on a per person basis. The farm average was a little less than a third of the urban average and the rural nonfarm somewhat less than two-thirds of the urban. In general, these relationships carried over into both the relatively unprocessed category and the several subdivisions of processing.

There were much greater differences among households in the three urbanization categories in average use of canned and frozen foods than for other forms and for relatively unprocessed foods. Considering variations in use of purchased foods among households grouped by income, one finds that the rural nonfarm households showed the greatest degree of income elasticity in use of purchased unprocessed foods. The highest elasticity in use of processed foods was evidenced among farm households, reflecting substantial increases at higher income levels in use of bakery products, frozen foods, and the "other processed" category.

Differences in Patterns by Stage.- About the same relationships among the three urbanization categories were shown in the purchases of all foods and in purchases of foods processed in the second and third stages. Within the second stage, canned foods took about a third of average expenditures by urban and rural nonfarm households, but between a fourth and a fifth of farm expenditures. The lower level for farm households reflects the availability of home-canned supplies.

On the average, at least half again as much was spent for processed single commodities (second stage) as for prepared mixed foods (third stage) by households in each urbanization. But the relationship varied among groups of households. Lower-income urban households and rural nonfarm households at

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16/ Economists use the term "income elasticity" to describe the degree of variation in consumption or expenditures with variation in income.

most income levels divided their expenditures in the proportions of two for processed single commodities to one for mixed foods. Higher-income urban households spent at the rate of $45 to $50 per person per year for processed single commodities compared with around $35 for mixed foods.

Farm households at most income levels divided their expenditures for second and third stages roughly three to two. But farm households having incomes early in 1942 at the annual rate of $3,000 or more spent almost as much for processed mixed foods as for processed single commodities, with most of the dollar increase going for baked goods.

Spring 1955 Household Expenditures by Form of Processing

In spring 1955 average expenditures for food at home by farm households were approximately half of the urban rate, and rural nonfarm expenditures were about 80 percent of urban. Expenditures for relatively unprocessed foods accounted for 56 to 58 percent of food expenditures by urban households, and 51 to 57 percent by rural nonfarm households, but they ranged from 42 to 57 percent by farm households, averaging 48 percent. 17/

Out of total expenditures for farm food commodities by households in each of the three urbanizations, 4 to 5 percent went for frozen foods, about 9 percent for canned items, 6 percent for cured and dried foods, and 7 to 9 percent for baked goods. The "other processed" category was allocated 17 percent of average urban expenditures for farm food commodities, 19 percent of the rural nonfarm average, and 23 percent of the farm average. For frozen, canned, cured and dried foods, urban average expenditures were approximately twice as large as the farm average. Urban households spent at an average rate of $28 per person per year for baked goods (spring average multiplied by 52), rural nonfarm - $24, and farm - $17. For "other" forms of processed foods, urban expenditures averaged about $65, rural nonfarm $58, and farm $43.

The greatest variations in expenditures for processed foods among households in the several income categories occurred in frozen foods. This held true for households in all three urbanizations. Among farm households expenditures for each form of processing varied more with income level than among nonfarm households. For canned foods, urban expenditures per person by the highest income groups of households were at least half again as much as those by households in the lowest income groups, but rural nonfarm expenditures more than doubled and farm expenditures tripled.

17/ These ranges are based on average expenditures by households in each income class.

Spring 1955 Household Expenditures by Stage of Processing

For processed single commodities, the second stage, average farm expenditures per person amounted to 57 percent of the urban average and rural nonfarm 87 percent. Thus the rural averages were closer to the urban average for the single processed commodities than was the case for all food expenditures. Average expenditures by farm households for the older types of processed mixed foods (third stage) were slightly closer to the urban average than for the second stage because the availability of home-produced foods reduced the need for buying second stage products. Rural nonfarm expenditures for the older mixed foods were about 82 percent of the urban average, bearing approximately the same relationship as for all foods. Farm household expenditures for newer mixed foods represented somewhat less than half of the urban average, but rural nonfarm average expenditure was 84 percent of urban.

Within the second stage of processing, canned foods accounted for about a fourth of average expenditures by each urbanization category of households. There was not much variation with income level within each urbanization category. Frozen foods were much more important in urban than in rural expenditures, and purchases varied greatly with income. Nonfarm expenditures for cured and dried foods represented a somewhat smaller proportion of expenditures for processed single commodities than the proportion of such expenditures by farm households.

Among the older types of mixed foods, classified as the third stage of processing bakery products were allocated about two-fifths of average expenditures by households in each urbanization. The urban proportion varied little with income level. Lower-income rural households spent for bakery products a somewhat larger proportion of their money allocated to processed mixed foods than did higher-income rural households. Those foods classified under "other" (including jams, jellies, candy, prepared mixes, and salad dressings) took about a third of expenditures by households in each urbanization for the third stage of processed foods. Within the third stage, expenditures for canned foods were less important than those for frozen. Except for the lowest income class, farm expenditures for frozen prepared foods of the older types were not much less than the urban average per person, but farm expenditures for canned mixed foods were significantly lower than the rural nonfarm and urban rates.

For the newer mixed foods, the fourth stage, canned items were much more important than the frozen commodities, and more important for urban households than expenditures for "other forms." This did not hold for the farm and rural nonfarm households which used substantially less of the newer canned mixed foods. Only higher-income urban and rural nonfarm households reported significant purchases of the newer frozen mixed foods. Farm expenditures for all of the newer prepared foods averaged less than half of the urban rate, but the rural nonfarm average was only 16 percent lower than the urban.

The ratio of average expenditures by each urbanization category of households for the second and third stages was about 60 percent for the second and 40 percent for the third. This relationship held generally across the income scale for urban and rural nonfarm households. But low-income farm households spent a somewhat smaller proportion on the second stage of processed foods than did nonfarm households because of home production and home processing. However, higher-income farm household patterns were close to those for nonfarm households in terms of their allocation among stages of processing, though the general level of expenditures was lower.

Changes in Expenditure Patterns From 1942 to 1955

Changes in Overall Expenditure Patterns.- Farm and rural nonfarm average expenditures in spring 1955 were much closer to the urban rates for all foods, for relatively unprocessed foods, and for processed foods than in spring 1942. From 1942 to 1955, each urbanization category reduced the share of its expenditures for farm commodities allocated to the relatively unprocessed items. The urban proportion dropped from 60 to 57 percent, the rural nonfarm from 59 to 53 percent, the farm from 58 to 48 percent. In terms of percentages, these reductions were offset by increases in the shares allocated to frozen products by all groups of households, and to canned items and the "other" category by farm households.

Changes in Patterns for Forms of Processed Foods.- The variation in expenditures for frozen foods with income level was reduced for each of the three urbanizations from 1942 to 1955, but in each the general level of expenditures in relation to income was higher. 18/ The variation with income or "income elasticity" of urban expenditures for canned foods was higher in 1955 than in 1942, but the other two urbanizations shifted their income-expenditure relationships (that is, their Engel curves 19/) to a higher level with relatively little change in elasticity. For baked products, urban and farm income elasticity was apparently lower in spring 1955 than in 1942, but among rural nonfarm households the income elasticity of such expenditures increased. For foods in the "other processed" category, urban and farm households at the several levels of income varied their expenditures to about the same degree as their patterns in 1942, whereas rural nonfarm variation with income increased.

18/ In 1942 the only significant frozen item was ice cream.

19/ Engel curves are the graphic relationships obtained by plotting the average rates of consumption for each income class against its average income.

Changes in Patterns by Stage of Processing.- Farm and rural nonfarm rates of expenditures in relation to income were generally closer to the urban rates for each stage of processing in 1955 than they were in 1942. The relative importance of canned foods among processed single commodities, second stage, was less in 1955 for urban and rural nonfarm households than it had been in 1942. As in 1942, the 1955 relationships of urban expenditures for processed single commodities to those for processed mixed foods varied according to the income level of households. More than half again as much was spent in 1955 for processed single commodities by lower-income urban households as for processed mixed foods, whereas high-income urban households spent only 25 to 30 percent more for processed single foods.

In 1955 expenditure patterns of rural nonfarm households varied by income level as did those of urban households instead of holding to the ratio of $2 for processed single foods to each dollar for processed mixed foods, observed for spring 1942.

Between 1942 and 1955, lower- and middle-income farm households substantially increased their expenditures for processed mixed foods. Thus their expenditures for the third and fourth stages of processing combined in 1955 were only about a fourth less than the amounts they spent for processed single commodities.

Table 5.--Approximate farm values per person of unprocessed and processed farm foods purchased for consumption at home in spring 1955, annual rates at 1947-49 average prices, U. S. by urbanization and income 1/

Section A. Subdivision by stage of processing

Urbanization, household size, and income (dollars)	Total purchased	First stage, relatively unprocessed forms	With additional processing			
			Total	Second stage	Third stage	Fourth stage
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
All urbanizations	141.95	89.82	52.12	36.70	13.98	1.45
Urban						
All households 2/	160.05	104.35	55.70	39.07	14.95	1.68
1-person	175.61	114.25	61.36	46.60	13.92	.84
2 or more	159.36	103.84	55.52	38.92	14.93	1.67
Under 2,000 2/	130.47	84.36	46.11	34.47	10.77	.86
Under 1,000	127.18	80.09	47.09	36.34	9.57	1.18
1-2,000	131.14	85.40	45.73	34.04	11.01	.69
2-3,000	142.60	91.01	51.59	37.44	12.76	1.39
3-4,000	150.02	96.44	53.58	37.15	14.83	1.59
4-5,000	157.63	102.32	55.31	38.18	15.20	1.93
5-6,000	167.86	109.92	57.95	40.00	16.03	1.91
6-8,000	172.73	112.12	60.61	41.64	17.05	1.91
8-10,000	170.70	112.21	58.48	39.69	17.02	1.78
10,000 and over	186.29	124.99	61.31	42.26	16.85	2.19
Rural nonfarm						
All households 2/	135.17	82.48	52.69	37.54	13.83	1.32
1-person	158.74	94.51	64.23	47.30	15.65	1.28
2 or more	134.44	82.21	52.23	37.22	13.69	1.32
Under 2,000 2/	95.77	58.51	37.26	28.55	8.07	.64
Under 1,000	82.44	50.14	32.30	25.57	6.36	.36
1-2,000	103.65	63.48	40.17	30.36	9.09	.72
2-3,000	128.21	76.69	51.52	37.40	12.97	1.14
3-4,000	131.87	78.81	53.06	37.36	14.38	1.32
4-5,000	147.61	92.14	55.48	39.04	14.76	1.68
5-6,000	151.37	93.29	58.08	40.19	16.37	1.51
6-8,000	159.26	97.75	61.50	43.16	16.83	1.52
8-10,000	173.24	110.33	62.92	42.43	18.15	2.34
10,000 and over	162.29	102.70	59.59	41.24	16.94	1.41
Farm						
All households 2/	80.63	43.73	36.90	25.58	10.48	.84
1-person	119.64	65.81	53.83	38.89	14.23	.74
2 or more	80.15	43.50	36.63	25.44	10.39	.82
Under 2,000 2/	67.90	38.50	29.40	21.42	7.49	.49
Under 1,000	61.90	37.22	24.68	18.58	5.79	.31
1-2,000	74.57	40.10	34.48	24.51	9.26	.71
2-3,000	82.86	43.28	39.58	27.58	11.13	.86
3-4,000	85.98	45.61	40.37	26.99	12.24	1.14
4-5,000	89.96	46.81	43.15	29.29	12.66	1.20
5-6,000	100.29	54.02	46.28	31.24	13.75	1.28
6-8,000	93.55	50.32	43.23	29.31	12.71	1.21
8-10,000	88.03	43.51	44.51	31.34	12.23	.95
10,000 and over	125.73	76.63	49.09	31.72	15.84	1.53

See footnotes at end of table.

Continued -

Table 5.--Approximate farm values per person of unprocessed and processed farm foods purchased for consumption at home in spring 1955, annual rates at 1947-49 average prices, U. S. by urbanization and income 1/ Continued -

Section B. Subdivision by form of additional processing

Urbanization, household size, and income (dollars)	Total further processed	Canned	Frozen	Dried or cured	Baked	Other
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
All urbanizations	52.12	8.07	3.39	11.46	5.25	23.95
Urban						
All households 2/	55.70	8.94	3.97	12.06	5.73	25.00
1-person	61.36	10.75	3.37	15.85	6.19	25.21
2 or more	55.52	8.84	4.02	12.00	5.74	24.91
Under 2,000 2/	46.11	7.09	1.87	12.96	4.28	19.90
Under 1,000	47.09	7.60	2.32	13.90	4.21	19.06
1-2,000	45.73	6.92	1.70	12.60	4.22	20.29
2-3,000	51.59	8.73	2.45	12.21	4.62	23.59
3-4,000	53.58	8.54	3.20	12.11	5.63	24.10
4-5,000	55.31	9.17	4.13	11.25	5.79	24.98
5-6,000	57.95	8.92	4.39	12.58	6.10	25.96
6-8,000	60.61	9.45	4.86	12.66	6.76	26.87
8-10,000	58.48	8.77	5.65	10.22	6.13	27.70
10,000 and over	61.31	9.58	6.41	11.75	6.27	27.30
Rural nonfarm						
All households 2/	52.69	8.12	2.77	12.12	4.99	24.68
1-person	64.23	12.36	2.42	16.56	6.39	26.50
2 or more	52.23	8.03	2.76	11.96	4.94	24.53
Under 2,000 2/	37.26	5.58	1.07	10.80	3.09	16.72
Under 1,000	32.30	5.08	.82	9.95	2.63	13.83
1-2,000	40.17	5.83	1.22	11.18	3.40	18.55
2-3,000	51.52	9.07	2.23	11.22	4.32	24.68
3-4,000	53.06	8.16	2.59	12.12	5.23	24.96
4-5,000	55.48	8.15	2.99	12.10	5.38	26.86
5-6,000	58.08	8.30	3.68	12.72	6.04	27.34
6-8,000	61.50	10.04	3.85	13.99	6.25	27.38
8-10,000	62.92	8.81	6.18	14.09	5.97	27.86
10,000 and over	59.59	9.28	4.68	12.20	5.37	28.06
Farm						
All households 2/	36.90	4.79	2.18	7.68	3.63	18.61
1-person	53.83	8.85	2.04	12.37	6.92	23.65
2 or more	36.63	4.72	2.20	7.62	3.58	18.52
Under 2,000 2/	29.40	3.81	1.26	7.90	2.65	13.79
Under 1,000	24.68	2.89	.92	7.75	2.05	11.06
1-2,000	34.48	4.72	1.59	8.12	3.26	16.80
2-3,000	39.58	4.78	2.13	8.39	3.77	20.51
3-4,000	40.37	5.29	2.87	7.15	3.92	21.15
4-5,000	43.15	5.55	2.44	7.33	4.38	23.45
5-6,000	46.28	6.20	3.15	8.91	4.60	23.42
6-8,000	43.23	5.62	3.04	8.09	4.57	21.90
8-10,000	44.51	5.34	3.14	6.46	3.81	25.78
10,000 and over	49.09	6.64	5.10	10.65	5.01	21.69

1/ Stages described in text. The first stage includes the simplest forms of processing of foods for sale in retail stores as fresh or raw.

2/ Apparent discrepancy from the following 2 averages arises from use of rounded data.

Table 6.--Expenditures per person for relatively unprocessed and processed farm foods for consumption at home in spring 1942, annual rates in current dollars, by urbanization and income 1/

Section A. Subdivision by form

Urbanization and income (dollars)	Total expenditures	First stage, relatively unprocessed forms 2/	With additional processing 3/					
			Total	Canned	Frozen	Baked	Cured, dried	Other
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Urban								
All households	187.40	113.30	74.10	16.45	2.33	17.11	8.97	29.24
Under 500	125.45	73.45	52.00	13.22	.59	10.87	9.40	17.92
500-1,000	138.60	82.35	56.24	15.49	.42	12.10	8.28	19.95
1,000-1,500	159.17	94.48	64.69	15.51	1.41	14.10	7.58	26.09
1,500-2,000	175.93	106.25	69.68	15.77	1.73	16.47	7.63	28.08
2,000-2,500	194.04	117.48	76.55	17.01	2.25	17.33	9.47	30.49
2,500-3,000	209.73	130.79	78.94	15.28	3.47	18.91	10.08	31.20
3,000-5,000	209.30	123.21	86.09	18.06	3.61	20.08	10.54	33.80
5,000-10,000	225.79	144.10	81.69	14.53	2.76	19.42	9.02	35.96
Rural nonfarm								
All households	113.01	66.18	46.82	9.60	1.18	9.16	6.94	19.94
Under 500	78.29	47.33	30.96	6.62	.39	6.04	5.06	12.85
500-1,000	90.48	52.98	37.51	8.23	.42	6.97	5.72	16.17
1,000-1,500	111.97	64.02	47.95	9.51	1.40	10.06	6.99	19.99
1,500-2,000	128.01	72.17	55.84	10.84	1.92	11.66	7.27	24.15
2,000-3,000	137.65	79.40	58.25	12.24	1.78	11.22	8.41	24.60
3,000 or over	171.80	105.89	65.92	13.78	2.43	11.62	11.08	27.01
Rural farm								
All households	57.90	33.56	24.33	3.56	.49	5.65	2.95	11.68
Under 500	43.85	28.41	15.43	2.35	.12	3.58	2.22	7.16
500-1,000	54.96	32.11	22.85	3.83	.49	4.94	2.84	10.75
1,000-1,500	65.64	35.93	29.71	4.51	.97	6.70	2.31	15.22
1,500-2,000	92.79	50.36	42.43	6.67	.13	11.33	5.92	18.38
2,000-3,000	75.40	40.06	35.34	4.61	1.06	7.80	4.02	17.85
3,000 or over	85.32	42.20	43.13	5.62	3.01	11.11	3.40	19.99

Section B. Subdivision of second and third stages

Urbanization and income (dollars)	Second stage				Third stage				
	Total	Canned	Cured, dried	Other	Total	Canned	Frozen	Baked	Other
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Urban									
All households	44.69	15.45	8.97	20.27	29.41	1.00	2.33	17.11	8.97
Under 500	36.14	12.34	9.40	14.40	15.86	.88	.59	10.87	3.53
500-1,000	37.57	14.64	8.28	14.64	18.68	.85	.42	12.10	5.31
1,000-1,500	41.25	14.63	7.58	19.04	23.44	.88	1.41	14.10	7.05
1,500-2,000	42.47	15.08	7.63	19.76	27.21	.69	1.73	16.47	8.32
2,000-2,500	45.74	15.89	9.47	20.38	30.81	1.12	2.25	17.33	10.11
2,500-3,000	45.54	14.02	10.08	21.43	33.41	1.26	3.47	18.91	9.77
3,000-5,000	50.41	16.90	10.54	22.97	35.68	1.16	3.61	20.08	10.83
5,000-10,000	46.24	13.91	9.02	23.31	35.46	.63	2.76	19.42	12.66
Rural nonfarm									
All households	30.73	9.16	6.94	14.62	16.10	.44	1.18	9.16	5.32
Under 500	21.81	6.23	5.06	10.52	9.15	.39	.39	6.04	2.34
500-1,000	25.65	7.81	5.72	12.13	11.85	.42	.42	6.97	4.04
1,000-1,500	30.89	9.23	6.99	14.68	17.05	.28	1.40	10.06	5.31
1,500-2,000	35.26	10.56	7.27	17.42	20.58	.27	1.92	11.66	6.72
2,000-3,000	37.09	11.60	8.41	17.08	21.16	.64	1.78	11.22	7.52
3,000 or over	42.95	13.10	11.08	18.77	22.96	.68	2.43	11.62	8.24
Rural farm									
All households	14.87	3.32	2.95	8.61	9.47	.25	.49	5.65	3.07
Under 500	9.26	2.10	2.22	4.94	6.18	.25	.12	3.58	2.22
500-1,000	14.08	3.71	2.84	7.53	8.77	.12	.49	4.94	3.21
1,000-1,500	17.17	4.14	2.31	10.72	12.54	.37	.97	6.70	4.51
1,500-2,000	25.69	6.04	5.92	13.72	16.75	.63	.13	11.33	4.66
2,000-3,000	21.39	4.37	4.02	13.00	13.95	.24	1.06	7.80	4.85
3,000 or over	22.99	4.44	3.40	15.16	20.12	1.18	3.01	11.11	4.83

1/ Total U. S. is not given because home production by urban households was not reported. Expenditures by rural nonfarm and farm households derived from reported data. 2/ Includes the simplest forms of processing for sale in retail stores as fresh or raw. 3/ Second and third stages.

Table 7.--Expenditures per person for relatively unprocessed and processed farm foods for consumption at home in spring 1955, annual rates in current dollars, U. S. by urbanization and income 1/

Section A. Subdivision by form

Urbanization, household size and income (dollars)	Total expenditures	First stage, relatively unprocessed forms 2/	With additional processing 3/					
			Total	Canned	Frozen	Baked	Dried, cured	Other
	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
All urbanizations	331.05	182.39	148.66	29.83	13.43	25.45	19.21	60.74
Urban								
All households 4/	380.45	215.48	164.97	33.89	16.28	28.24	21.26	65.29
1-person	432.34	247.62	184.72	38.13	14.36	31.70	28.23	72.30
2 or more	378.64	214.38	164.25	33.47	16.35	28.18	21.02	65.23
Under 2,000 4/	273.47	157.87	115.59	23.75	7.67	19.83	18.89	45.45
Under 1,000	267.87	151.86	116.02	24.24	8.29	18.44	21.34	43.71
1-2,000	274.63	159.97	114.65	24.01	7.76	20.22	17.88	44.78
2-3,000	311.68	174.95	136.72	30.29	10.53	22.03	18.95	54.92
3-4,000	347.21	194.74	152.47	31.38	13.26	27.40	20.18	60.25
4-5,000	371.13	206.66	164.48	34.77	16.34	28.38	20.21	64.78
5-6,000	402.25	227.87	174.36	35.11	17.33	30.03	22.56	69.33
6-8,000	419.52	235.99	183.52	35.94	19.27	32.88	23.55	71.88
8-10,000	429.72	242.52	187.20	35.72	22.76	30.90	21.55	76.27
10,000 and over	502.86	287.80	215.06	43.65	27.80	33.71	25.35	84.55
Rural nonfarm								
All households 4/	299.26	159.15	140.11	27.72	11.24	23.83	19.18	58.14
1-person	360.35	183.82	176.52	41.05	9.12	29.65	26.91	69.79
2 or more	297.55	157.98	139.57	27.49	11.34	23.66	18.99	58.09
Under 2,000 4/	194.12	109.10	85.03	16.43	4.63	14.52	13.72	35.73
Under 1,000	165.39	94.78	70.60	14.09	3.65	12.17	11.65	29.04
1-2,000	211.31	116.62	94.68	18.03	5.41	15.93	14.88	40.43
2-3,000	270.18	141.97	128.21	28.20	9.08	20.22	16.65	54.06
3-4,000	292.62	153.27	139.35	28.25	10.37	24.57	18.02	58.14
4-5,000	331.31	178.48	152.82	29.93	12.41	25.93	20.14	64.41
5-6,000	339.35	177.03	162.33	29.94	14.84	28.13	22.32	67.10
6-8,000	371.45	193.38	178.06	34.07	15.72	31.17	27.03	70.07
8-10,000	417.76	222.39	195.37	35.71	22.81	28.10	28.65	80.10
10,000 and over	400.30	211.17	189.13	34.86	22.33	29.10	22.61	80.23
Farm								
All households 4/	185.19	89.22	95.97	16.06	8.79	16.70	11.09	43.33
1-person	267.73	119.46	148.27	29.86	9.14	31.62	21.08	56.57
2 or more	184.25	88.75	95.51	15.75	8.75	16.50	11.13	43.38
Under 2,000 4/	147.66	77.40	70.26	11.64	5.16	11.78	10.32	31.36
Under 1,000	128.50	72.72	55.77	9.25	3.65	9.12	9.51	24.24
1-2,000	169.03	82.64	86.40	14.65	6.72	14.78	11.15	39.10
2-3,000	189.15	86.92	102.23	16.19	8.73	17.21	12.91	47.19
3-4,000	202.54	94.57	107.97	18.74	11.29	18.37	10.80	48.77
4-5,000	212.32	96.79	115.54	19.82	9.61	19.82	11.41	54.88
5-6,000	229.89	105.94	123.94	21.21	11.97	22.12	13.68	54.96
6-8,000	220.19	103.89	116.29	19.85	11.00	20.82	13.27	51.35
8-10,000	217.36	90.71	126.64	20.20	12.97	18.50	11.27	63.70
10,000 and over	318.41	165.02	153.39	27.66	21.73	25.41	20.30	58.29

See footnotes at end of table.

Continued -

Table 7.--Expenditures per person for relatively unprocessed and processed farm foods for consumption at home in spring 1955, annual rates in current dollars, U. S. by urbanization and income [1] - Continued

Section B. Subdivision by stage of processing

Urbanization, household size and income (dollars)	Second stage					Third stage					Fourth stage	
	Total	Canned	Frozen	Cured, dried	Other	Total	Canned	Frozen	Baked	Other	Total [5]	Canned
	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
All urbanizations	85.26	22.33	5.00	19.21	38.73	59.49	5.47	8.28	25.45	20.30	3.90	2.03
Urban												
All households [4]	94.20	24.75	6.48	21.26	41.70	66.12	6.65	9.47	28.24	21.76	4.65	2.49
1-person	117.87	29.71	5.94	28.23	53.98	65.37	7.92	8.42	31.70	17.33	1.48	.50
2 or more	93.41	24.29	6.69	21.02	41.41	66.01	6.54	9.34	28.18	21.95	4.83	2.65
Under 2,000 [4]	71.27	18.33	2.62	18.89	31.42	42.83	4.68	5.05	19.83	13.28	1.50	.75
Under 1,000	74.79	18.85	3.73	21.34	30.87	39.36	5.39	4.35	18.44	11.19	1.86	.00
1-2,000	69.70	18.42	2.35	17.88	31.06	43.33	4.51	5.42	20.22	13.18	1.62	1.08
2-3,000	82.29	23.00	3.24	18.95	37.10	50.54	5.02	7.13	22.03	16.36	3.89	2.27
3-4,000	85.29	22.54	4.57	20.18	38.01	62.46	6.04	8.54	27.40	20.48	4.71	2.80
4-5,000	92.11	24.81	6.54	20.21	40.56	66.86	6.69	9.51	28.38	22.29	5.50	3.27
5-6,000	98.62	25.25	7.32	22.56	43.48	70.53	6.87	9.71	30.03	23.91	5.23	2.99
6-8,000	103.39	26.46	8.41	23.55	44.96	75.25	6.88	10.55	32.88	24.93	4.89	2.60
8-10,000	105.36	26.38	11.30	21.55	46.12	77.32	7.69	11.15	30.90	27.58	4.52	1.66
10,000 and over	120.71	29.96	12.39	25.35	53.01	89.31	10.95	14.84	33.71	29.82	5.04	2.74
Rural nonfarm												
All households [4]	81.82	21.43	3.75	19.18	37.46	54.40	4.65	7.34	23.83	18.58	3.90	1.65
1-person	110.39	29.65	3.19	26.91	50.63	59.75	6.39	5.93	29.65	17.79	6.39	5.02
2 or more	81.19	21.25	3.83	18.99	37.12	54.55	4.68	7.37	23.66	18.84	3.83	1.56
Under 2,000 [4]	54.23	14.36	1.12	13.72	25.04	29.67	2.07	3.51	14.52	9.57	1.12	.00
Under 1,000	46.26	12.87	.70	11.65	21.04	23.65	1.22	2.96	12.17	7.30	.70	.00
1-2,000	58.91	15.03	1.35	14.88	27.65	33.97	2.71	4.06	15.93	11.27	1.80	.30
2-3,000	76.90	22.01	2.89	16.65	35.35	47.87	4.68	6.05	20.22	16.92	3.44	1.51
3-4,000	79.84	22.11	3.41	18.02	36.30	55.41	4.09	6.96	24.57	19.79	4.09	2.05
4-5,000	87.59	22.62	4.14	20.14	40.69	60.42	5.38	8.14	25.93	20.97	4.83	1.93
5-6,000	92.39	22.71	5.81	22.32	41.55	66.58	6.19	8.90	28.13	23.35	3.36	1.03
6-8,000	104.00	26.62	5.52	27.03	44.83	70.34	6.34	10.07	31.17	22.76	3.72	1.10
8-10,000	110.79	25.25	10.18	28.65	46.70	77.25	6.79	11.95	28.10	30.41	7.33	3.67
10,000 and over	104.29	26.22	6.63	22.61	48.83	79.22	5.33	15.70	29.10	29.10	5.62	3.31
Farm												
All households [4]	54.04	13.38	1.78	11.09	27.78	39.89	2.04	7.01	16.70	14.15	2.04	.64
1-person	87.14	23.89	1.05	21.08	41.11	60.08	5.97	8.08	31.62	14.41	1.05	.00
2 or more	53.50	13.12	1.75	11.13	27.50	40.00	2.00	7.00	16.50	14.50	2.00	.63
Under 2,000 [4]	41.02	9.92	.79	10.32	19.98	27.92	1.32	4.37	11.78	10.45	1.32	.40
Under 1,000	34.01	8.08	.52	9.51	15.90	21.24	1.17	3.13	9.12	7.82	.52	.00
1-2,000	49.72	12.76	1.07	11.15	24.72	35.07	1.48	5.64	14.78	13.17	1.61	.40
2-3,000	57.70	13.41	1.27	12.91	30.11	42.26	2.15	7.46	17.21	15.44	2.28	.63
3-4,000	58.71	15.39	2.11	10.80	30.41	46.04	2.11	9.18	18.37	16.38	3.23	1.24
4-5,000	65.09	15.85	1.80	11.41	36.03	47.20	2.64	7.81	19.82	16.93	3.24	1.32
5-6,000	67.74	16.99	2.17	13.68	34.89	53.14	3.08	9.81	22.12	18.13	3.08	1.14
6-8,000	64.84	16.40	3.24	13.27	31.93	47.68	1.73	7.77	20.82	17.37	3.78	1.73
8-10,000	73.69	16.91	3.40	11.27	42.11	51.15	3.30	9.57	18.50	19.78	1.81	.00
10,000 and over	80.14	22.08	4.16	20.30	33.60	69.57	4.51	17.57	25.41	22.08	3.68	1.07

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[1] Stages described in text and demonstrated in Exhibit A.

[2] The simplest forms of processing for sale in retail stores as fresh or raw foods.

[3] Stages 2-4.

[4] Apparent discrepancy from the following 2 averages arises from use of rounded data.

[5] Includes some frozen and other processed forms.

FACTORS RELATED TO VARIATIONS IN CONSUMPTION OF PROCESSED FOODS

Factors affecting consumption of commercially processed foods may be subdivided according to whether they primarily affect supply or demand. The supply elements include technological changes, cost relationships, and marketing institutions and facilities. Demand elements include the influence of income, urbanization, home-food production, and employment and education of homemakers.

Although available data and procedures do not permit measurement of the influences of the supply elements on consumption of processed foods, it is possible to identify some of the major changes which have occurred in the last decade or two. Among technological changes, we immediately think of the quick freezing of foods, particularly the concentrated and prepared items, and the development of instant coffee. The increases in the prices of relatively unprocessed foods from 1947 to 1954 were more than those for processed foods except bakery products. These prices probably reflect costs involved, and they have apparently encouraged some of the shift in consumption to processed foods. Changes in marketing institutions and facilities are illustrated by the increased availability of processed foods, especially frozen commodities. Another type of major change has been the great expansion in supermarkets offering varied and large stocks from which consumers can choose.

The influence of demand factors on changes in the consumption of processed foods cannot be studied directly with time-series data because such data concurrently reflect the effects of changes in supply. But sets of cross-section data derived from household food surveys provide indications of the possible effects of major demand elements.

Changes in the extent of home-food production occurring in the last 20 years have been influenced by the relative decrease in the farm population and by the effects of availability of refrigeration facilities on beef production for home use and on the rural use of commercially processed meat and other foods. The decline in home-food production has been a kind of intermediate factor in the demand for processed foods, being caused by changes in income, urbanization, and ways of living. Therefore, its effects have not been singled out in this study.

Changes in Income

The importance of changes in income to changes in the purchase and use of processed foods can be studied by reweighting the spring 1942 and spring 1955 consumption patterns of the several income groups within each urbanization by alternative income-size distributions. 20/ Such calculations indicate that changes in income from 1942 to 1955 could have raised the per capita quantity of relatively unprocessed farm foods purchased by U. S. consumers about 7 percent and the quantity of all processed forms of food combined to about the same extent. The increases in income clearly had more effect on consumption of frozen foods than on other processed forms.

Changes in income-size distributions from 1942 to spring 1955 could have raised average U. S. expenditures per person for unprocessed foods for home consumption about 8 percent and expenditures for processed foods about 9 or 10 percent. The patterns of expenditures for canned foods in relation to income were somewhat more elastic in spring 1955 than in 1942. Apparently, the effect of increased income on expenditures for canned foods could have raised the U. S. average 5 to 10 percent, in constant dollars. For frozen foods, increased income may have caused a rise in average expenditures of 15 to 25 percent. For other forms of processing, the income effect probably amounted to around 10 percent.

Changes in Urbanization

The effects of shifts in the distribution of the population among the three urbanization categories from 1942 to 1955 (1) on purchases of processed farm foods and (2) on expenditures were tested, using farm value data and household expenditure figures. The very substantial change in urbanization which took place between 1942 and 1955 could not have increased purchases of unprocessed and major processed forms of farm foods more than 2 to 4 percent per person. Because the income-food relationships for the three urbanizations were somewhat closer in 1955 than they had been in 1942, use of 1955 expenditure data in such an analysis yields the slightly lower measure of the effect of changes in urbanization.

20/ The term "income-size distribution" refers here to distribution of the housekeeping population among groups or classes based on size of disposable money income per family. These distributions are commonly converted to percentages of totals, which can then be used to combine average expenditures or quantities for each income class to derive U. S. averages. The procedures used to calculate the effects of changes in income-size distribution, urbanization, and the relationships of consumption of processed foods to income level are similar to those described on pages 578-585 of the article, "An Economic Appraisal of Changes in Rural Food Consumption," Jour. Farm Econ., Aug. 1958 (2).

Changes in the Relationships of Consumption of Processed Foods to Income

The effects of changes in income-food relationships are measured as a residual after adjustment for the effects of changes in income and urbanization. 21/ Changes in these relationships include the effects of both supply and demand elements. Demand elements include such factors as changes in home-food production and in employment and education of homemakers, less domestic help, less emphasis on home training in food preparation, greater premium on saving time for other activities than cooking, more children, changing child-feeding practices, and less home storage space.

For relatively unprocessed foods, there was apparently no significant change in the relationships of purchased items to income between spring 1942 and spring 1955.

For processed foods, there is considerable evidence of changes in income-food relationships or patterns. About two-thirds of the change in the per capita quantity of farm foods purchased, and three-fourths of the increase in expenditures, cannot be explained by the effects of changes in income and urbanization. Much of the overall increase in levels of use of commercially processed foods probably offset decreases in home-food production.

About two-thirds of the change in the quantity of farm foods purchased in the canned form and four-fifths of the expenditure change for such foods between 1942 and 1955 are not explainable by income and urbanization shifts. Detailed analysis of the data for spring 1942 and spring 1955 revealed a notable rise in the rural Engel curves for these commodities.

Most of the change in the purchases and expenditures for frozen foods cannot be attributed to income and urbanization changes. This is obvious when one considers the major technological and marketing changes occurring in this period, which resulted in much higher levels of Engel curves for frozen foods purchased by all households. In the case of baked goods, the fall in the Engel curve of income-purchase relationships for urban households was apparently offset by some rises in the Engel curves for rural households and by the effects of income and urbanization shifts.

Both the quantity purchased and expenditures for cured and dried foods per capita increased several times as much as survey information on the relationship of the purchases of these items to income and urbanization levels would lead one to expect. The higher Engel curve for purchased pork products appears to have contributed importantly to the shift. For processed foods other than those noted above, the relationships between the levels of real

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21/ The procedure for such adjustments is described in the reference given in note 20.

income and urbanization and the quantity of farm commodities purchased in such forms per person changed relatively little from 1942 to 1955. But levels of expenditures changed substantially. Significant were expenditures for the new processed foods, such as instant coffee, and increased purchases of such items as luncheon meats and bottled beverages.

Effects of Employment and Education of Homemakers

Analysis of the spring 1955 purchases of processed foods by urban households provides a basis for judging the influences of employment of homemakers and their level of education on purchases of processed foods. Households with employed homemakers used more bakery products per person than households in which homemakers did not have outside employment, but there was no significant difference in their use of processed fruits and vegetables. Urban homemakers with higher levels of education but in comparable income and urbanization categories used more frozen and canned fruits and vegetables than did less educated homemakers in the same types of households.

THE OUTLOOK FOR CONSUMPTION OF PROCESSED FOODS

Finally, what is the outlook for changes in the consumption of processed foods? Answers must be based on the prospects for changes that affect the consumption of processed foods and the historical effects of such changes.

From the supply side, further technological changes and developments are likely; these are the subject for later research. Costs of transporting and handling foods in all forms are likely to continue to rise with changes in wage rates, problems in handling supplies in congested metropolitan areas, and higher costs of materials unless more efficient methods of handling are developed and widely adopted. Improved handling of fresh and frozen products is generally viewed to be necessary to do a better job of maintaining quality in order to hold and regain consumer acceptability. But the net costs of such improvements cannot now be foreseen, nor their effects measured.

Demand of Eating Places

The demand for factory processed foods by eating places, the away-from-home food market, is likely to increase owing to rising labor costs in restaurants and other eating establishments. Although we may expect further increases in the proportion of the total food supply handled by eating places, we lack basic statistical and economic information on which to develop sound projections for this segment of the market.

Household Consumption

Future demand for processed foods for home consumption must be evaluated in terms of possible effects of potential increases in income, changes in urbanization, and changes in the relationships of purchased processed foods to income level and urbanization category. Further decline in home-food production will be related to these changes. The importance of such production in the overall food picture may be halved in the next 10 to 20 years, as farm population declines further and as rural areas become more urbanized.

Related to Income Changes.- We start with the projection or assumption that real incomes per capita may rise about 50 percent from 1954 to 1975 on a per capita basis. 22/ Such an increase in real income per capita might be expected to increase per capita quantities of both relatively unprocessed and

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22/ Income projections based on data in Daly, Rex F. "Prospective Domestic Demands for Food and Fiber." Policy for Commercial Agriculture -- Its Relation to Economic Growth and Stability (3).

processed foods purchased about 5 to 7 percent from 1955 to 1975. 23/ Greatest increases are likely in frozen foods, the smallest in cured and dried forms.

Urbanization Shifts.- Using 1955 relationships of food purchases to urbanization and projected changes in urbanization, our analyses indicate the likelihood that prospective changes in this factor would have relatively little effect on the demand for processed foods in the next 15 years or so. 24/ The 1955 relationships of expenditures to urbanization lead to the hypothesis that expected shifts in urbanization might increase average purchases of unprocessed foods somewhat more than those of processed foods. But changes in urbanization during the last 20 years affected purchases of processed foods more than those of unprocessed foods, contrary to the findings from static cross-section data. In sum, it is safe to say that urbanization shifts in the next 15 years are not likely to have as much bearing on changes in the food picture as they had during the last 15 to 20 years.

Changes in Consumption Patterns.- Changes in the relationships of purchases of processed foods to income and urbanization categories constitute an area in which statistical and economic research can provide few definitive answers. Changes in income-processed food relationships are tied closely to technological developments and sociological changes. Nevertheless, from the historical data developed for this study, we may derive some working hypotheses about possible future changes in income-food consumption relationships reflected in Engel curves.

Basing our judgment on such data, we may expect little change in relationships of purchases of relatively unprocessed foods to income and urbanization. The big items in this group are the fluid milks; fresh meat, poultry and fish; eggs; fresh fruits and vegetables; flour; and sugar. Development of a concentrated sterile milk with wide consumer acceptance, improvements in processing and promotion of quick frozen meats and fish, and increased costs of handling such foods as fruits and vegetables could alter this expectation of relatively little change to a considerable degree.

For processed foods we have witnessed marked changes in relationships of consumption to income and urbanization in recent years. Canned foods have a significant advantage over some other forms in that reasonable handling has relatively little effect on their quality, whereas the handling of frozen,

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23/ These projections were developed using (1) income-size distributions estimated on basis of those for 1955 and the projected change in average income (assuming no major changes in the proportional distribution of income), (2) 1955 average quantities for households in each income class within each urbanization category, (3) 1955 distribution of the population among the three urbanization categories.

24/ Louis J. Ducoff's estimate that the farm population in 1975 may be only about 7 percent of the U. S. total is given in "The Farm Population and the Agricultural Labor Force in 1975." Pages 70-72 of Bogue, Donald J. (Editor), Applications of Demography; The Population Situation in the U. S. in 1975 (4). Estimates of 75 percent for urban and 18 percent for rural nonfarm appear plausible.

baked, and some of the other processed forms of foods requires much more care. Therefore, if new canned products continue to be introduced and their quality carefully controlled, we may see some further increases in consumption by given real income and urbanization categories of consumers.

Further expansion may be expected in the frozen foods industry based on technological and product developments and improved marketing facilities, but at a somewhat reduced rate. Accordingly, some further increases in the levels of consumer purchases of frozen food items for home consumption may be expected for given levels of income and urbanization. Further expansion in the consumption of frozen foods will be dependent in part on efforts of industry to maintain quality in the movement of frozen foods from packers to ultimate consumers. 25/

A repetition of the rise in relationships of cured and dried foods to income (the Engel curves) seems quite unlikely. The change from 1942 to 1955 was particularly influenced by increased consumption of cured pork for which consumption levels are now relatively high.

Within the "other processed" foods category are butter, cheese, instant coffee, mayonnaise and salad dressing, shortening, margarine, confectionery, jams and jellies, and sausage. This group will include foods prepared and preserved by new methods in the future. Even though projections for such a mixed bag of foods are very hazardous, it appears likely that significant increases in the overall level of consumption for this group in relation to real income and urbanization status will occur.

Summary of Projections

At this point, let us summarize the projections of potential changes in per capita purchases of the relatively unprocessed and the commercially processed foods for home consumption over the next 15 to 20 years on the basis of assumed changes in income, urbanization, and continued technological and social change. In constant dollars, expenditures per capita for farm commodities are likely to go up more than the rate of increase for farm value as more marketing services are added to the basic farm commodities in the forms of food preparation, handling, and quality control. The per capita quantity of all purchased farm foods for home consumption may increase from the 1955 level as much as 15 percent by 1975. 26/ The percentage increases in per capita quantity and expenditures for processed foods for home consumption are likely to be half again as much as those for relatively unprocessed foods. The increase in the

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25/ A detailed discussion of the outlook for frozen items was given in The Outlook for Frozen Foods. AMS-154 (13).

26/ Changes in quantity purchased is measured by changes in farm value of all purchased farm foods, using 1947-49 average farm prices. This projection for purchased foods may be compared with Daly's projection for farm foods (including home-produced supplies) from 1956 to 1975 of about a 10 percent increase (3). Per capita use of farm foods was slightly higher in 1956 than in 1955.

quantity of unprocessed foods might run a little lower than 15 percent (say 13 percent), increase for processed foods, in quantity terms may be a little more (perhaps 18 percent).

Historical data on changes in the quantity of major forms of processed foods purchased and cross-section information on variations in their use among groups of households appear to indicate slightly less increase in the quantity of canned foods than in the average for all processed foods. Average consumption of commercially frozen foods may go up another 40 or 50 percent per capita, and the "other processed" group might increase as much as a fourth. Only minor increases in per capita quantities are likely for dried, cured, and commercially baked foods.

Possible Effects on Demand for Farm Commodities

Finally, we come to the question of how this outlook for food processing affects the outlook for demand for farm commodities. At this stage, it is possible only to call attention to certain ideas, not to make definitive statements.

Important in this evaluation is the problem of changes in the ratios of wastes and losses in farm-food commodities between the farm gate and the consumer to the total flows of foods into consumption. Some of these losses or wastes result from cutting, trimming, and refining to obtain edible products. Others result from decay through time as food is handled and moved from one place to another. Research is now under way to consider the economic alternatives of (1) permitting given types and rates of decay of farm products and (2) the use of marketing resources in various processes for preserving food or special handling to prevent such decay. Quantity measures used in this bulletin are in terms of farm commodities sold; projections imply no major changes in the relative importance of marketing wastes and losses.

U. S. civilians are likely to increase the per capita quantities of farm foods they buy and to increase simultaneously their dollar outlays for food processing and for meal preparation and serving. Even so, it is not likely that the proportion of disposable income allocated to food will be greater in future years than in recent years. There are a number of indications, in fact, that the proportion of disposable income spent for food and food-marketing services will be less in the future than in the past. In view of the complications and complexities of the modern food distribution system and consumer demand for conveniences in all types of consumer goods, a distinct possibility exists that increases in the degree of food processing and major technological changes are essential to these prospects for increases in average purchases of farm food commodities. However, additional research is necessary on costs of handling relatively unprocessed foods and of manufacturing and marketing processed foods under changing economic conditions before satisfactory appraisals of the effects of food processing on the demand for farm commodities can be developed.

APPENDIX

BENCHMARK DATA ON PROCESSED FOODS

Historical data for benchmark years on the consumption of farm foods in alternative forms and on the flow of domestic farm foods into processing are mostly derived from Agricultural Marketing Service statistics on United States food supplies and their distribution. The lack of annual information on the extent of processing of some foods required the development of supplementary data, much of them from the Censuses of Manufactures, and the use of selected years only. The following description of data and methods used applies in most instances to data in tables 1 through 3 and to supplementary data on processing of domestic farm foods in tables 8 through 10.

Sources of Data

The Agricultural Marketing Service regularly prepares and publishes statistics on the supply and distribution of all foods, including separate information on major canned, frozen, and dried products. 27/ These data are based on periodic reports of the Bureau of the Census, AMS, and for some information, other Government and private organizations. The most important distribution category for U. S. food is, of course, consumption by U. S. civilians. Such totals include food produced for own use, mostly by farmers, foods processed by farmers for sale (such as meat and butter), and supplies moving through commercial channels. Statistics on home production by farm households, developed by the Agricultural Estimates Division, are supplemented for some commodities by rough approximations of home production developed by the Agricultural Economics Division. Information on farmer processing of foods for sale is collected for the crop and livestock reports of the Agricultural Estimates Division.

Data on the output and consumption of commercially handled foods in each major form were developed from AMS supply and distribution data, supplemented by detailed breakdowns for some commodities based on reports of the Bureau of the Census, special Government surveys, and trade associations.

The Censuses of Manufactures, because of their extensive coverage, are the most important source of detailed information on food processing. They provide information on the production of all major processed foods and of groups of minor items, as well as statistics on materials used. Although these Censuses were the primary source of data, some of the information was inadequate, necessitating use of adjusted data developed by other organizations for a number of items. For example, flour production reported in the

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27/ Detailed information supplied in Agr. Handb. 62 Consumption of Food in the United States, 1909-52 (10) on sources of data, methods, uses and limitations of the statistics. The Supplements for 1956 and 1958 revise and bring to date series in the original edition of the handbook.

Censuses of Manufactures is slightly underestimated. The information is regularly adjusted by statisticians in the U. S. Department of Agriculture, working with Census specialists. For another example, statistics from the Census of Manufactures on quantities of flour and eggs used in bakery products were used as a first approximation, then adjusted upward to allow for incomplete coverage of small retail bakeries, relying on technical advice from statisticians of the Bureau of the Census.

Another type of report of the Bureau of the Census, used as a source, is that of the monthly and annual reports for individual industries, such as the one on factory production and use of fats and oils in processing specified products, Animal and Vegetable Fats and Oils (15).

Reports of the Agricultural Estimates Division that pertain to statistics on the disposition of agricultural commodities yielded information on quantities of a number of food commodities going into processing, for example, oranges into concentrates, chilled juices, and canning. Another type of AMS report that supplied data for this study is illustrated by Peanut Stocks and Processing (14), which reports the quantities of peanuts used in processing.

Many of the AMS and Census data on production of processed foods are published regularly in statistical handbooks issued by the Statistical and Historical Research Branch, AMS. For example, the annual supplements to Dairy Statistics (11) carry series on use of milk in a number of dairy products and on the production of other items. Occasional articles in the commodity situation reports issued by this Branch provide information on the use of farm commodities in minor processed foods.

Information on the use of sugar by several types of industries is supplied by the Sugar Reports (18), regularly issued by the Commodity Stabilization Service. These form part of the reporting on the administration of sugar distribution controls.

Some special AMS surveys have obtained data on use of particular foods by manufacturers of food products. Examples are Survey of Fruit and Tree Nut Use by Frozen Dessert Manufacturers (9) and Availability of Fresh or Frozen Ready-to-Cook Poultry (6). A number of food trade associations carry on statistical reporting programs for their members and make the information available to the Department of Agriculture. Examples of such data used in this study are the details of the packs of canned fruits and vegetables from the National Canners Association.

Description of Methodology

The first step taken in this study was the tabulation of all available historical statistics on each type of processing for each commodity. This information included the quantities of each farm commodity going into each type of processing and/or the quantities of each type of processed food manufactured. Considerable effort was expended in checking and reconciling apparently conflicting sets of data and in filling gaps where the extent of processing of an individual food in all forms was not reported. For example, the AMS reports quantities of fruits sold to processors. The Census of Manufactures contains data on the manufacture of major processed fruit products and some information on materials used. Commodity coverage and types of firms reporting had to be checked and fruit equivalents of products compared with materials used, AMS statistics on fruits for processing and AMS special surveys on fruit marketing.

Some commodity flows into processing are regularly estimated and reported by the Department of Agriculture. These include the quantities of many fruits and vegetables going into processing, milk into dairy products, peanuts into peanut oils. Some trade organizations report quantities of individual commodities processed; for example, potato processing is estimated by the National Potato Council.

Production of many processed foods is reported rather completely. Such data were converted to farm commodity equivalents, using factors from Conversion Factors and Weights and Measures for Agricultural Commodities and Their Products (20). Content of mixed foods such as bakery products, canned meat mixtures, and mayonnaise was subdivided into such commodities as flour, milk, refined sugar, meat, and fats and oils. In the cases of fats and oils and some of the meat products, further subdivision among the primary commodities was made according to the best available information, as from surveys of household consumption, processing, and information on materials used.

Since the objective of this measurement was to study historical changes in the overall volumes of farm commodities flowing into major forms and stages of processing, information on individual commodities was combined in terms of farm values. To derive these values, in general, we used 1947-49 farm prices developed for the index of supply-utilization of farm commodities, described on page 23, Agr. Handb. 91, Measuring the Supply and Utilization of Farm Commodities (12). However, an initial step was necessary for those food products which are joint products. For example, first the wholesale weights of beef carcasses, offal, and other beef products were valued at their 1947-49 wholesale prices. Then the total wholesale value of beef products was adjusted back to the farm value of cattle slaughtered, by means of the ratio in each year of the value at 1947-49 farm prices of the cattle slaughtered to the value of the products produced, at 1947-49 wholesale prices. A comparable procedure was used for such items as pork products, oils, and flour and cereals. A detailed description of such calculations is given on pages 24-26 of Agr. Handb. 91.

The mass of statistics for all farm food commodities assembled in the foregoing procedure had to be summarized in order that general ideas of changes in the flow of foods into processing might be formulated. The bases for the summarization are described in the introduction of this report and in Exhibit A.

Limitations of These Data

These historical statistics have been developed to measure the changes in the extent of processing major food commodities. Their limitations are of three types: (1) They are not as precise as researchers on particular sectors of processing might wish because of inadequacies of the basic data; (2) no changes in relative prices are reflected by these dollar values because 1947-49 farm prices have been used for all years to combine individual food commodities into total foods; (3) these data provide no information on the values or amounts of marketing services added to the farm commodities by the several forms of processing. The latter limitations stem from the procedures used. However, all data on subsectors of food consumption and food output add to totals regularly estimated by AMS.

Problems With Basic Data.- Although it is generally believed that the extent of processing by wholesale and retail establishments has decreased in relative importance over the last 30 years, statistics available for measuring their output are not very satisfactory. Therefore, it is difficult to maintain consistent coverage of processing by wholesale and retail establishments. Two important examples are retail bakeries and candy makers. These establishments go in and out of business rather frequently. Many of their records of output are inadequate. Some establishments are not covered by the Census of Manufactures because they fall below the minimum size for reporting. To cope with this problem, we have used all available Government and trade information and relied heavily on the suggestions of industry statisticians of the Bureau of the Census and of commodity specialists in the Department of Agriculture.

Reporting of the output of new products and of new forms of processing always lags behind industrial developments. Production of new foods still of minor importance may be grouped in "all other" categories, may be skipped entirely, or may be incompletely reported because new establishments open up between the benchmark years of the Censuses. The frequent lack of precise information on commodity content partly reflects variability in processing formulas, which change with relative prices of alternative foods. It is also partly tied to the lack of information on the output of each kind of food within a product category. For example, we know relatively little about what kinds of pies are produced and the relative importance of each. This is relatively unimportant in the overall food picture, but we may underestimate or overestimate the amount of fruit used in these forms because of lack of information on their relative importance.

It is possible that the volumes of foods flowing into the third and fourth stages of processing may be somewhat underestimated. If so, overestimates for the first and second stages must compensate because the totals for the several stages were the overall statistics on the flow of food commodities into civilian use. The coverage of flour, eggs, fats and oils, and sugar in combined foods is somewhat uneven, but the results shown in the tables reflect the best estimates we have been able to make after several years of research.

Problems Resulting From Methods.- No changes in the relative prices of farm commodities are reflected in the farm value data developed for this measurement because 1947-49 prices were used for all computations. The use of fixed prices was necessary in order to measure changes in the overall quantity of farm commodities processed for foods. All farm value data were computed with farm prices and equivalent quantities of individual farm commodities. Therefore, they reflect only the farm resources used.

The measures described in this study provide no information on the values or amounts of marketing services added to the farm commodities. Recent research by the Marketing Research Division, AMS, on the extent of food processing includes the study of factory processing by William H. Waldorf. 28/

28/ "Indexes of Factory Production of Domestic Farm Food Products." Marketing and Transportation Situation, July 1959 (21). The data used in his study exclude wholesale and retail processing and measure only net value added by factory processing. Statistics on value added by processing used in these indexes exclude nonfood materials and energy used in the processing of the farm commodities. Further information will be given in the Technical Bulletin (22).

Table 8.--U. S. farm production for food use subdivided by stage of processing, approximate farm values at 1947-49 prices, selected years 1/

Stage of processing	Approximate farm values at 1947-49 prices						Percentage distribution					
	1925	1929	1935	1939	1947	1954	1925	1929	1935	1939	1947	1954
	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Production for food -- total	15,341	15,851	15,107	17,101	22,202	23,579	100.0	100.0	100.0	100.0	100.0	100.0
Produced for home use	2,839	2,723	2,837	2,859	2,586	1,921	18.5	17.2	18.8	16.7	11.6	8.1
Farmer processed for sale	326	278	276	260	268	165	2.1	1.8	1.8	1.5	1.2	.7
Commercial -- total handled	12,176	12,850	11,994	13,982	19,348	21,493	79.4	81.0	79.4	81.8	87.2	91.2
First stage	8,129	8,378	7,955	9,089	12,886	13,595	53.0	52.8	52.7	53.2	58.1	57.7
Second stage	3,316	3,602	3,248	3,906	4,894	6,202	21.6	22.7	21.5	22.9	22.0	26.3
Canned	424	448	520	657	1,249	1,300	2.8	2.8	3.4	3.8	5.6	5.5
Frozen	3	5	3	13	96	648	2/	2/	2/	.1	.4	2.8
Cured and dried	1,228	1,307	825	1,158	1,178	1,465	8.0	8.3	5.5	6.8	5.3	6.2
Other	1,661	1,842	1,900	2,078	2,371	2,789	10.8	11.6	12.6	12.2	10.7	11.8
Third stage	731	870	791	985	1,558	1,533	4.8	5.5	5.2	5.7	7.1	6.5
Canned	9	8	9	20	60	75	.1	.1	.1	.1	.3	.3
Frozen	98	114	91	129	283	313	.6	.7	.6	.7	1.3	1.3
Baked	454	551	505	632	882	795	3.0	3.5	3.3	3.7	4.0	3.4
Other	170	197	186	204	333	350	1.1	1.2	1.2	1.2	1.5	1.5
Fourth stage 3/	---	---	---	2	10	163	---	---	---	2/	2/	.7

1/ Estimates based on Bureau of the Census, AMS, and trade data. Stages of processing described in text and outlined in Exhibit A. Includes supplies flowing into stocks and exports. Excludes all nonfood uses. Statistical data are comparable to those of the supply-utilization index.

2/ Less than 0.05 percent.

3/ In 1939 and 1947 all canned; in 1954, $15 million canned, $39 million frozen, and $109 million other.

Table 9.--Production for food use of major groups of farm commodities moving through commercial channels, subdivided by stage of processing, valued at 1947-49 farm prices, selected years 1/

Commodity group and stage of processing	1925	1929	1935	1939	1947	1954
	Million dollars	Million dollars	Million dollars	Million dollars	Million dollars	Million dollars
Total handled commercially	12,176	12,850	11,994	13,982	19,348	21,493
Meat animals	5,151	5,039	4,546	5,587	7,803	8,597
First	3,490	3,196	3,163	3,750	5,537	5,766
Second	1,658	1,840	1,380	1,829	2,216	2,745
Third	3	3	3	8	50	60
Fourth	---	---	---	---	---	26
Poultry	492	527	523	657	1,086	1,743
First	492	527	523	647	1,002	1,276
Second 2/	---	---	---	10	84	459
Third	---	---	---	---	---	---
Fourth	---	---	---	---	---	8
Eggs	1,066	1,177	1,010	1,171	1,846	2,043
First	1,000	1,090	913	1,029	1,642	1,841
Second	---	---	---	---	---	---
Third	66	87	97	142	204	129
Fourth	---	---	---	---	---	73
Dairy products	1,739	2,081	2,127	2,380	3,185	3,713
First	603	805	808	918	1,478	1,780
Second	1,009	1,111	1,183	1,287	1,376	1,561
Third	127	165	136	175	331	372
Fourth	---	---	---	---	---	---
Fats and oils 3/	564	607	428	583	775	920
First	312	354	203	274	267	343
Second	169	152	134	154	237	327
Third	83	101	91	155	270	242
Fourth	---	---	---	---	1	8
Fruit and tree nuts	552	625	758	828	1,023	991
First	367	422	502	540	613	497
Second	139	162	217	265	380	458
Third	46	41	39	23	26	28
Fourth	---	---	---	---	4	8
Vegetables and vegetable type crops 4/	1,227	1,311	1,367	1,390	1,752	1,828
First	954	1,063	1,093	1,093	1,278	1,252
Second	273	248	270	283	450	526
Third	---	---	4	12	19	38
Fourth	---	---	---	2	5	12
Grains	1,218	1,312	1,043	1,168	1,636	1,412
First	762	774	589	670	899	680
Second	66	86	60	72	140	112
Third	390	452	394	426	597	600
Fourth	---	---	---	---	---	20
Sugars and sirups	128	127	157	178	193	192
First	111	105	128	130	123	109
Second	2	3	4	6	11	14
Third	15	19	25	42	59	61
Fourth	---	---	---	---	---	8
Miscellaneous 5/	39	44	35	40	49	54
First	38	42	33	38	47	51
Second	---	---	---	---	---	---
Third	1	2	2	2	2	3
Fourth	---	---	---	---	---	---

1/ Stages described in text. The first stage includes the simplest forms of processing of foods for sale in retail stores as fresh or raw. 2/ Includes relatively small quantities going into mixed foods because data necessary for separation were not available. 3/ Includes edible peanuts. 4/ Vegetables, potatoes, sweetpotatoes, dry beans and peas, and cowpeas. 5/ Popcorn, mustard seed, and honey.

Table 10.--Production for food use of major groups of farm commodities, subdivided by type of processing, valued at 1947-49 farm prices, selected years

Year and commodity group	Relatively unprocessed 1/				With additional processing 2/					Total
	Slaughtered	Sorted, packaged	Milled	Refined	Canned	Frozen	Cured, dried	Baked	Other processed 3/	
	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.
1925										
Total handled commercially	3,982	2,996	762	389	433	101	1,228	454	1,831	12,176
Meat animals	3,490	---	---	---	29	---	1,131	---	501	5,151
Poultry	492	---	---	---	---	---	---	---	---	492
Eggs	---	1,000	---	---	---	---	---	62	4	1,066
Dairy products	---	603	---	---	87	96	1	23	929	1,739
Fats and oils	---	34	---	278	6	---	---	61	185	564
Fruits and tree nuts	---	367	---	---	33	2	96	2	52	552
Vegetables and vegetable type crops 4/	---	954	---	---	273	---	---	---	---	1,227
Grains	---	---	762	---	3	2	---	301	150	1,218
Sugars and sirups	---	---	---	111	2	1	---	5	9	128
Miscellaneous 5/	---	38	---	---	---	---	---	---	1	39
1929										
Total handled commercially	3,723	3,461	774	420	456	119	1,307	551	2,039	12,850
Meat animals	3,196	---	---	---	51	---	1,204	---	588	5,039
Poultry	527	---	---	---	---	---	---	---	---	527
Eggs	---	1,090	---	---	---	---	---	80	7	1,177
Dairy products	---	805	---	---	97	112	2	43	1,022	2,081
Fats and oils	---	39	---	315	5	---	---	68	180	607
Fruits and tree nuts	---	422	---	---	49	3	101	3	47	625
Vegetables and vegetable type crops 4/	---	1,063	---	---	248	---	---	---	---	1,311
Grains	---	---	774	---	3	3	---	349	183	1,312
Sugars and sirups	---	---	---	105	3	1	---	8	10	127
Miscellaneous 5/	---	42	---	---	---	---	---	---	2	44

See footnotes at end of table.

Continued -

Table 10.--Production for food use of major groups of farm commodities, subdivided by type of processing, valued at 1947-49 farm prices, selected years -Continued

Year and commodity group	Relatively unprocessed 1/				With additional processing 2/					Total
	Slaughtered	Sorted, packaged	Milled	Refined	Canned	Frozen	Cured, dried	Baked	Other processed 3/	
	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.
1935										
Total handled commercially	3,686	3,396	589	284	529	94	825	505	2,086	11,994
Meat animals	3,163	---	---	---	62	---	690	---	631	4,546
Poultry	523	---	---	---	---	---	---	---	---	523
Eggs	---	913	---	---	---	---	---	87	10	1,010
Dairy products	---	808	---	---	111	89	5	37	1,077	2,127
Fats and oils	---	47	---	156	2	---	---	57	166	428
Fruits and tree nuts	---	502	---	---	75	3	130	2	46	758
Vegetables and vegetable type crops 4/	---	1,093	---	---	274	---	---	---	---	1,367
Grains	---	---	589	---	1	1	---	312	140	1,043
Sugars and sirups	---	---	---	128	4	1	---	10	14	157
Miscellaneous 5/	---	33	---	---	---	---	---	---	2	35
1939										
Total handled commercially	4,397	3,645	670	377	679	142	1,158	632	2,282	13,982
Meat animals	3,750	---	---	---	126	---	1,018	---	693	5,587
Poultry	647	---	---	---	10	---	---	---	---	657
Eggs	---	1,029	---	---	---	---	---	131	11	1,171
Dairy products	---	918	---	---	132	125	6	42	1,157	2,380
Fats and oils	---	27	---	247	6	---	---	98	205	583
Fruits and tree nuts	---	540	---	---	112	6	134	2	34	828
Vegetables and vegetable type crops 4/	---	1,093	---	---	285	6	---	---	6	1,390
Grains	---	---	670	---	2	2	---	345	149	1,168
Sugars and sirups	---	---	---	130	6	3	---	14	25	178
Miscellaneous 5/	---	38	---	---	---	---	---	---	2	40

See footnotes at end of table.

Continued -

Table 10.--Production for food use of major groups of farm commodities, subdivided by type of processing, valued at 1947-49 farm prices, selected years -Continued

Year and commodity group	Relatively unprocessed 1/				With additional processing 2/					Total
	Slaughtered	Sorted, packaged	Milled	Refined	Canned	Frozen	Cured, dried	Baked	Other processed 3/	
	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.
1947										
Total handled commercially	6,539	5,090	899	358	1,318	379	1,178	882	2,705	19,348
Meat animals	5,537	---	---	---	332	5	976	---	953	7,803
Poultry	1,002	---	---	---	28	56	---	---	---	1,086
Eggs	---	1,642	---	---	---	---	---	186	18	1,846
Dairy products	---	1,478	---	---	270	274	73	47	1,043	3,185
Fats and oils	---	32	---	235	8	1	---	155	344	775
Fruits and tree nuts	---	613	---	---	234	8	129	3	36	1,023
Vegetables and vegetable type crops 4/	---	1,278	---	---	432	27	---	---	15	1,752
Grains	---	---	899	---	3	3	---	473	258	1,636
Sugars and sirups	---	---	---	123	11	5	---	18	36	193
Miscellaneous 5/	---	47	---	---	---	---	---	---	2	49
1954										
Total handled commercially	7,042	5,457	680	416	1,390	1,001	1,465	795	3,247	21,493
Meat animals	5,766	---	---	---	389	54	1,239	---	1,149	8,597
Poultry	1,276	---	---	---	74	393	---	---	---	1,743
Eggs	---	1,841	---	---	---	---	---	113	89	2,043
Dairy products	---	1,780	---	---	230	302	143	54	1,204	3,713
Fats and oils	---	36	---	307	6	2	---	131	438	920
Fruits and tree nuts	---	497	---	---	207	163	83	4	37	991
Vegetables and vegetable type crops 4/	---	1,252	---	---	469	75	---	---	32	1,828
Grains	---	---	680	---	3	3	---	475	251	1,412
Sugars and sirups	---	---	---	109	12	9	---	18	44	192
Miscellaneous 5/	---	51	---	---	---	---	---	---	3	54

1/ The minimum amounts of processing required for retail sales as fresh or raw products (stage 1). 2/ Stages 2-4. 3/ Such as ready-to-eat meats, sausages, cheese, maynonnaise and salad dressings, macaroni and noodles, confectionery, prepared mixes, potato and corn chips, malt food products, jams and jellies. 4/ Vegetables, potatoes, sweetpotatoes, dry beans and peas, and cowpeas. 5/ Popcorn, mustard seed, and honey.

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